

THE INDEPENDENT GUIDE TO **IBM** PERSONAL COMPUTERS



Volume 4 Number 4

\$2.95

February 19, 1985

2010:
AN IBM
ODYSSEY

Focus on Video

25 Eye-Catching Boards for Your IBM

**A Rags to
Riches Story
From Price
Waterhouse**

**Enable:
Integrated
Excellence**

**Programming:
Doing the
Subdirectory
Shuffle**



The power
behind your PC is
right behind
this page.

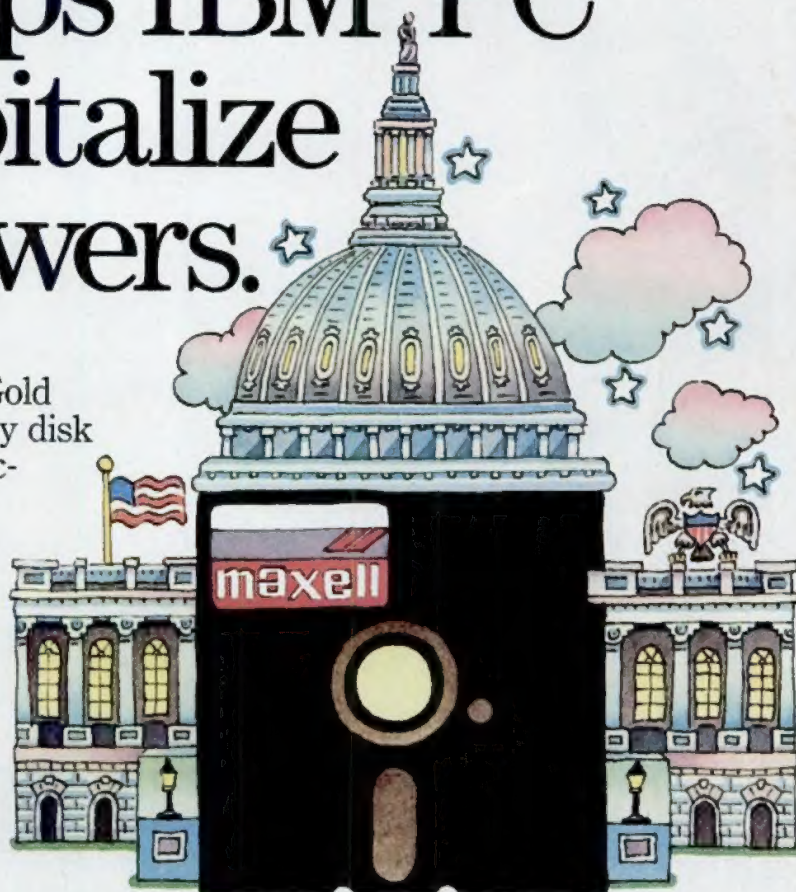


Maxell Gold.

The floppy disk that
lets PC ATTM speed ahead,
makes PC/XTTM
X-traordinary,
and helps IBM[®] PCTM
capitalize
on its powers.

For your Big Blue, only the Gold Standard will do. Maxell. The floppy disk chosen by many disk drive manufacturers to test their new equipment. Each Gold Standard is backed by a lifetime warranty. And each is a perfect match for your IBM. In fact, there's a Gold Standard for virtually any computer made. Even if it's the new IBM PC AT!

maxell.
IT'S WORTH IT.

PC AT, PC/XT and PC are trademarks of IBM Corp.Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074CIRCLE 517 ON READER SERVICE CARDCopyrighted

SOFTWARE SHOULDN'T MAKE YOU FEEL FOOLISH.



INTRODUCING ABILITY.™

**THE BUSINESS SOFTWARE THAT
WORKS WITH YOU. NOT AGAINST YOU.**



Choosing business software can really be a circus. Sometimes all the jokes seem to be at your expense.

But there's no need to clown around anymore with hard to learn programs. Now you have the ABILITY™.

Like a welcome blast of clean, fresh air, ABILITY is the new business software for the 80's. If you care about excellence, but don't feel like marrying a computer to get it: ABILITY is for you.

This is a program smart enough to help you do significant things with ease. Without having to go through foolishness first. And ABILITY is made to be learned in less than a day.

Look at the menu screen above and see what we mean. The entire program is quick, and understandable. A pleasure to use.

A reminder line's always on your screen, to show you exactly where you are and what you can choose next. And, when you want it, help is yours in a key stroke.

Easy? Definitely.

But this product is also very powerful.

ABILITY includes spreadsheet, database, word processing, telecommunication, graphs –and “Presentation!”, an exclusive feature to present ideas with new impact.

ABILITY has complete integration of all these functions (not just partial like some). That bit of hard work on our part means it's easy for you to use one function with another.

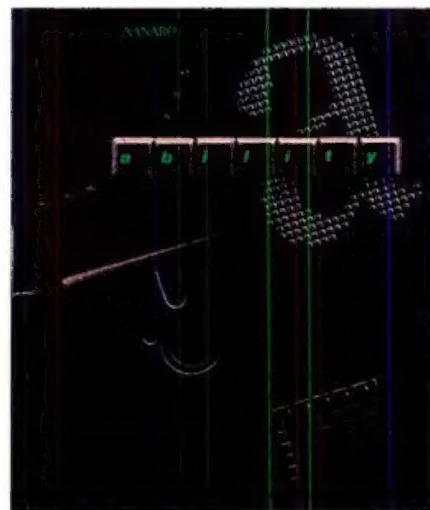
Like words with graphs, or all of it with telecommunications.

In fact, ABILITY gives you the versatility that many competitors lack. The more you know about the others, the more you'll be impressed with ABILITY.

Powerful. But powerful enough to be easy.

	ABILITY	SYMPHONY	FRAMEWORK
Data Base	Limited by Disk Size Only	Limited by RAM	Limited by RAM
Memory required to load full product	256K RAM	320K RAM	384K RAM
Can custom make a diskette presentation screen	Yes	No	No
Suggested retail price	\$495	\$695	\$695

For more information about ABILITY, the most significant business software available, see the expert at your computer products store. Try it out. We think you'll be very pleased.



NOW YOU HAVE THE ABILITY.

FREE DATABASE

MANAGEMENT SYSTEM *

Includes Accounting, Payroll,

Inventory & A/R Applications

PROGRAMMABLE RELATIONAL

FULL VERSION NOT A DEMO

- Report Generator
- Manual is on disk
- Customizable Screens
- ASCII Output
- Written in Basic for easy modification

- Tax Tables
- Creates Subfiles
- Sort on 3 Fields
- Recalculate Files
- Over 15,000 Lines of Source Code Given
- Form Generator
- Subrecords
- Numeric Ranges
- Subtotals

- 3 Files Open Simultaneously
- Global Field Changes
- Key strings to numbers
- Real time transfers between files
- Retrieve on conditions for each field
- Recommended by Barron's Microcomputing Journal, Houston Area League of PC Users & Fred Blechman in his new book.
- 14 Ways to Calculate Fields
- Transfer Data between files
- A user supported program
- Much More

AND SPREADSHEET

PROGRAMMABLE FULL VERSION NOT A DEMO

- 21 ways to calculate numbers or write your own subroutines
- Written in basic for easy modification
- Compiled Version Provided (192K)
 - Sample Checkbook & Income Tax Applications
 - Numbers & Text may be placed anywhere on the screens
 - Automatic Recalculation
 - Source Code Given
 - Graphics, Bar Charts
 - Full Cursor Control

AND EXPERT SYSTEM

INFERENCE ENGINE

PROGRAMMABLE FULL VERSION NOT A DEMO

- Design your own Expert Systems
- Diagnoses Multiple Problems
- Determines Multiple Solutions
- Assigns Probability with Rules
- Intelligent Search Pattern with Manual Override
- Logic Path through Subcategories displayed
- Detects Contradictory Evidence
- Explanation of Reasoning

- Accepts Unknown Input
- Source Code & Compiled Version (192K)
- Written in Basic for easy modifications
- Sample Application
- No Royalties on Applications

SUPERIOR IN SEVERAL AREAS

You get the source code in Basic. We wrote the program in Basic because most users, like you, already know how to program in Basic. Why waste your time learning an inferior one package "language" like Fred! or Macro!™ With the source code you can modify the system to do anything that can be done in Basic.

You do not have to be a software engineer to use the system. The entire system is menu driven. You do not have to learn hundreds of commands. You do not have to keep reading the manual since all the options are displayed on the screen.

If you write any application programs in basic you can reduce your programming time by 50% or more. You probably waste 50% to 80% of your time coding the inputting of data, storage of the data in files, retrieval of data, correction of data, screen design and other repetitious tasks. By using the database or spreadsheet to handle your repetitious tasks you will reduce your programming time by 50% or more. There are no royalties on applications.

- for IBM PC, XT or AT with 128K
 - PC Jr. with 128K & Cartridge Basic
 - Compatibles with 192K & Microsoft Basic

NO STRINGS ATTACHED

You do not have to buy anything else to use the system. We don't even sell any software (except for the cost of the disks & handling). We developed the programs in house for our own use. We are not selling the programs because we do not want to be in the software publishing business. We are giving the programs away as a public service & for the good publicity. The \$20 fee covers the cost of the 4 disks and the advertising so we are not losing any money on this offer.

PPE

POTOMAC PACIFIC ENGINEERING INC.

Box 2027 Gaithersburg MD 20879 (301) 977-1489

- * Copy the system from someone who already has one OR
- For the latest most powerful edition send \$20 to cover the costs of 4 DSDD disks 1st class mail, envelope, copying & handling.
- Available on 8 SSDD disks, \$10 extra
- Outside USA add \$3. MD residents add 5% tax
- Allow 2 to 3 weeks for delivery
- No C.O.D., P.O. or Credit Card orders.

Please send the "Database of Steel," the "Spreadsheet of Steel" & the Expert System of Steel to:

Name _____

Street _____

City/State/Zip _____



The Independent Guide to
IBM Personal Computers

PUBLISHER	Jeff Weiner
EDITOR	Bill Machrone
EXECUTIVE EDITORS	Mike Edelhart, Paul Somerson
MANAGING EDITOR	Barry Owen
TECHNICAL EDITOR	Craig L. Stark
ASSISTANT MANAGING EDITORS	Posy Gering, Gus Venditto
ASSOCIATE EDITORS	Jennifer de Jong, Barbara Krasnoff, Stephanie Stallings
SENIOR EDITOR, PC NEWS	Don Kennedy
SENIOR COPY EDITORS	Jean Atelsek, Janet Lewis
TECHNICAL ASSISTANT	Michael O'Conne
PRODUCTION EDITOR	Paul Ross
ASSISTANT EDITORS	Charles Bernant, Victoria Danoff, Virginia Dudek, Nina Kirschner, Lisa Kleinman, James Langdell, David Obregon, Ann Ovodow, Greg Pastrick, Fredric Paul
EDITORIAL ASSISTANTS	David Baker, Cheryl Goldberg, Jane Mintzer, Christina Okang, Roz Tobias
PROOFREADERS	Gerald Carney, Michael Espindle
OFFICE MANAGER	Iris Knittel
RECEPTIONIST	Carolyn Jones
CONTRIBUTING EDITORS	Richard Aarons, Frank J. Derfler, Jr., John Dickinson, Will Fastie, Glenn Hart, Stephen Manes, Peter Norton, Martin Porter, Winn L. Rosch, Corey Sandler, Craig Stinson, Jared Taylor, Robin Webster
DESIGN DIRECTOR	Peter J. Blank
ART DIRECTORS	Mary Zisk, Gerard Kunkel
ART EDITOR	Mariano Nicieza
ASSOCIATE ART DIRECTOR	Mark Jensen
ASSISTANT ART DIRECTORS	Rosalyn Migdal, Louise White
MECHANICAL ARTISTS	Monique Cubicciotti, Ilissa Goodheart, Sara Whitford
PRODUCTION ARTIST	Susan Ahlman
CIRCULATION MANAGER	Lori A. Hellevig
CIRCULATION ASSISTANTS	A. Hugh Kraft, Mickey Krueger
SUBSCRIPTION INFORMATION	(800) 631-8112
ADVERTISING DIRECTOR	Eugene Duncan
DISTRICT MANAGERS	
NORTHERN CALIFORNIA and NORTHWEST	Jeff Cohen, David Riegler (415) 598-2290
SOUTHERN CALIFORNIA, L.A. AREA	Barbara Farkas (213) 387-2100
ORANGE COUNTY, CA. and SOUTHWEST	Page Goodrich (213) 387-2100
NEW ENGLAND	Kathy Krochta (212) 503-5280
NEW YORK, NEW JERSEY and FLORIDA	Ellen Atkinson (212) 503-5307
MIDWEST	John Hemsath (312) 346-2600
MIDATLANTIC and SOUTHEAST	Bob Ostrow (212) 503-5308
ADVERTISING SALES MANAGER/TELEMARKETING	Pauline Scherer
ACCOUNT REPRESENTATIVES	Jane Anderson, Janet Bell, Joanna Broome, Stan Johnson, Steve Lincoln, Patty Schwartz, Pat Toohey
ADVERTISING COORDINATORS	Helen Forgenie, Scott E. Pearl
ASSISTANT to the PUBLISHER	Suzanne N. Silver
ADVERTISING OFFICE	Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016, (212) 503-5100
FOUNDER	Anthony Gold

COMPUTER PUBLICATIONS DIVISION

PRESIDENT	Kenneth H. Koppel
SENIOR VICE PRESIDENT	Eileen G. Markowitz
VICE PRESIDENT, EDITORIAL	Jonathan Lazarus
VICE PRESIDENT, PRODUCTION	Baird Davis
VICE PRESIDENT, LICENSING & SPECIAL PROJECTS	Jerry Schneider
VICE PRESIDENT, CREATIVE SERVICES	Herbert Stern
VICE PRESIDENT, CIRCULATION	Alicia Marie Evans
MARKETING MANAGER	Ronnie Sonnenberg
BUSINESS MANAGER	Gary A. Gustafson
EDITORIAL DIRECTOR	Ernest F. Baxter

ZIFF-DAVIS PUBLISHING

President Richard P. Friese, Senior Vice President Phillip T. Heffernan, Senior Vice President Philip Sine, Vice President William Phillips, Treasurer Selwyn Taubman, Secretary Bertram Abrams

PC: The Independent Guide to IBM Personal Computers ISSN (#0745-2500) is published bi-weekly for \$34.97 for one year (26 issues), \$61.97 for two years, and \$81.97 for three years. Additional postage \$44.00 for Canada and all other foreign countries. PC Communications Corp., a subsidiary of Ziff-Davis Publishing Co., One Park Ave., New York, NY 10016. Second-Class postage paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Address changes to PC: The Independent Guide to IBM Personal Computers, P.O. Box 2445, Boulder, CO 80322. Editorial and Business Office: One Park Ave., New York, NY 10016. Editorial (212) 503-5255, Advertising (212) 503-5100. For subscription inquiries and service, write to PC Magazine, P.O. Box 2445, Boulder, CO 80322. PC is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Entire contents Copyright © 1985 PC Communications Corp. All rights reserved; reproduction in whole or in part without permission is prohibited. The following are trademarks of PC Communications Corp.: PC, PC: The Independent Guide to IBM Personal Computers, PC Mart, PC-Lab, PC-Communications, Project PC, PC Tutor, PC: BlueBook, User-to-User, PC News. Permissions: Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Jean Lamensdorf, Ziff-Davis Publishing Company, One Park Ave., New York, NY 10016. Editorial Communications may be addressed to SOURCE BBB343, CompuServe 71226,713, or MCI Mail 157-9301.





“What do we mean by *honest* accounting software?”

We mean software that does what it says it will do; it works in the real world.

What does RealWorld™ accounting software do?

Our fully integrated accounting line offers General Ledger, Accounts Receivable, Accounts Payable, Order Entry, Inventory Control and Sales Analysis as honest solutions to your accounting problems. Our software runs on most popular micro-computers.

RealWorld software has been designed to suit your business accounting needs. Our software is built on the actual live feedback collected from our dealers and users over the last ten years.

An installed base of over 80,000 satisfied users has kept us in touch with the true needs of business accounting in the real world. An independent survey of computer retailers rated us #1 in technical performance, documentation, user friendliness, features and adaptability.

See for yourself what RealWorld can do

Seeing is believing—go to your local computer dealer and get a live demonstration of our software. You can enter real data about your real life accounting problems and see the results for yourself.

Insist on the accounting software that does what it says it will do. RealWorld is available at most major computer stores, or call us direct for the number of the dealer nearest you. Or send us the coupon below and we will mail the information to you without delay.



RealWorld Corporation
Dover Road
Chichester, N.H. 03263

1-603-225-9565

RealWorld is a trademark of RealWorld Corporation

I'd like more information about the Accounting Software that does what it says it will do and the name, address and phone # of the computer store nearest me that has RealWorld Accounting Software.

Name _____

Company _____

Address _____

City _____ State _____

Zip Code _____ Phone # _____

Hardware _____

Type of Business _____

PC021985



**The Independent Guide to
IBM Personal Computers**

VOLUME 4 NUMBER 4
FEBRUARY 19, 1985



[page 190](#)

COVER STORIES



[Adapted for the Screen](#) 116

Glenn A. Hart and Jim Forney/Third-party video boards can improve your screen's resolution and give you more color without annoying flicker.

[Video Board Reviews](#) 121

Glenn A. Hart and Jim Forney/This parade of 25 video boards spotlights both winners and also-rans, and you may see just what you're looking for.

[Video Wizardry with](#)

[PC-EYE](#) 173

Jim Forney/With just one expansion board, PC-EYE Video Capture System turns your PC into a picture machine that allows you to retouch and superimpose video images.

[The C-77 Video Mix-up](#) 186

Jim Forney/Rapitech's C-77 Video Mixer merges video images and computer-generated text and graphics on the same screen.

[Getting on the Air](#) 190

David Powell/Produce images for a television broadcast by programming the Motorola MC6845 CRT controller at the heart of the PC's color/graphics card.

FEATURES

APPLICATIONS

[The PC Pied Piper of North Dallas](#) 196

Scott Kariya/A Catholic priest finds that he can communicate with parish kids through his PC.

[2010: A PC Odyssey](#) 216

Barbara Krasnoff/Innovative filmmakers Robert Hollander and William Tondreau explain how they use PCs to create special effects—or SFX in film industry lingo—for movies such as the recently released *2010*.

[Oxford Goes On-Line](#) 233

Martin Porter/The mammoth *Oxford English Dictionary*, the most complete dictionary of the English language, is scheduled to go on-line by the end of the decade with the PC's help.

PRICE WATERHOUSE REPORT

[Accounting for Individual Tastes](#) 200

G. William Dauphinais and Glen Seller/The *Rags to Riches* program designed for very small businesses fills the gap between spreadsheets and automated accounting systems.

SOFTWARE

[Enable Does It Right](#) 209

Diane Burns and S. Venit/The *Enable* integrated package has taken the ideas behind first-generation integrated software products and gone them one better.

SPECIAL FEATURE

[A Microcomputer](#)

[Crossword](#) 226

Lindsay Van Gelder/Test your knowledge of microcomputer trivia.



[page 216](#)



PRO COLUMNS

DEPARTMENTS

PROGRAMMING

REDirecting Your Files 245

John Dickinson/A way to move your files from one directory to another without using COPY and ERASE.

MEDICINE

PC Clinical Testing 263

Michael Crouch/With *Clinical Research System*, you can systematically analyze statistical information using patient profiles.

FINANCE

Modeling with 1-2-3: the RAND Command 269

James Boswell/Use the RAND command in 1-2-3 to turn your spreadsheet into a financial model.

LAW

Legal Connections 273

Werner Grunbaum/The ideal law office of the future will probably use local area networks to link together large computers, micros, telephones, and other digital devices. But for now, attorneys generally rely on modems to share information and services.

EDUCATION

Hyped-Up Authoring 277

Gregory Dunn/HyperGraphics has released a capable courseware-authoring system that is useful for creating more than the usual multiple-choice quizzes.

WRITING

Throw Out Your Index Cards 331

Dara Pearlman/Here's how to turn your editing program into a simple, effective system for filing notes and keeping your research on track.

WHAT'S INSIDE 15

PC NEWS 33

Twelve pages of up-to-the-minute reports, interviews, minireviews, and useful tips, along with entertaining tales, fables, and juicy scoops from the computer community.

FROM THE EDITOR'S SCREEN

Manual Labor? 83

Paul Somerson/Truly well-designed software would make manuals a thing of the past. (For an opposing view, see Guest Editorial.)

GUEST EDITORIAL

Long Live the Almighty Manual . . 89

Joseph Rigo/Despite such advances as tutorials and help screens, nothing has yet been produced that renders a manual completely useless.

LETTERS TO PC 93

THE NORTON CHRONICLES

Full-Screen Output: Fast and Compatible 105

Peter Norton/Since DOS lets you down when it comes to writing information on the display screen, you'll want to know about three "screen drivers" that can handle the job.

USER-TO-USER 256

Paul Somerson/PC owners share tips and short programs that may just answer your question about your software or your PC.

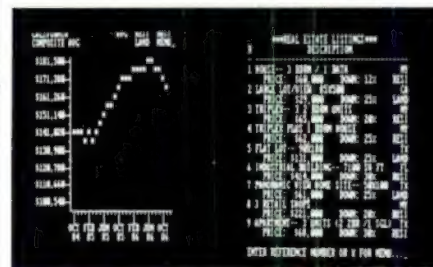
PC TUTOR 260

Mark Zachmann/Turn here for answers to readers' technical and nontechnical questions about personal computing.

PC ARCADE

Strategic Moves 241

Phil Wiswell/Test your mettle in a financial race or an international power struggle.



CLUB NEWS 281

Jane Mintzer/Listings of PC user groups.

NEW ON THE MARKET 285

David Obregon/The latest in hardware, software, and accessories for your PC.

PC BLUEBOOK 295

A quick reference guide.

PC:MART 308

PRODUCT INDEX 315

INDEX TO ADVERTISERS 322

BOOK REVIEW

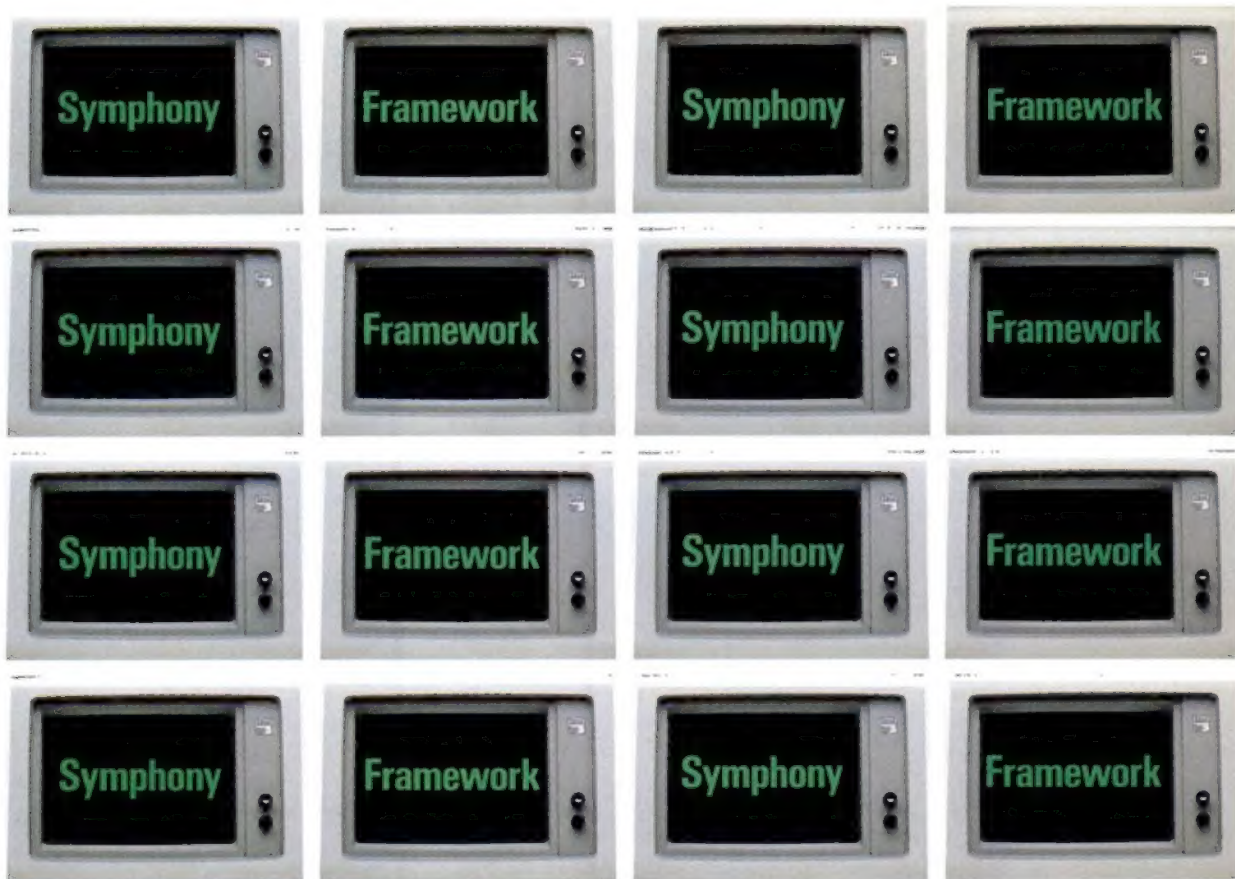
Peering into the PC's Brain: Assembly Language 327

Dean Hannotte/Two new primers on assembly language programming.

COMING UP

PC Tech Journal 320**PC Magazine** 333

Cover Photograph: Dennis Kitchen
Video Art: Gerard Kunkel



And you thought we only ran 1-2-3.

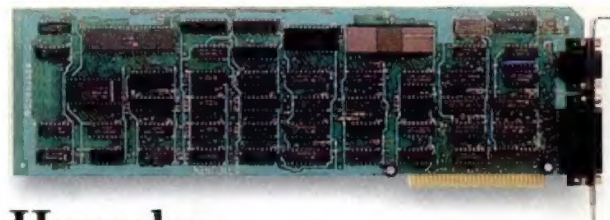
Why have we sold over 100,000 Hercules™ Graphics Cards? One reason is because we give the standard version of 1-2-3™ the highest resolution possible on an IBM® PC or AT.™

Now we've brought the same high resolution to Symphony™ and Framework,™ giving them sharper, flicker-free text and graphics.

It took software support for Hercules to become the best selling graphics card for the IBM Monochrome Display. Support from dozens of companies like Lotus,™ Ashton-Tate,™ and Microsoft,® who wrote programs to run on the Hercules Graphics Card.

Why did they support Hercules? Simple. The Hercules Graphics Card's resolution of 720×348 is twice IBM's (640×200)*. A parallel printer port is standard — not an extra cost option. And we're so confident of the reliability of our graphics cards that we back every one with a two year warranty.

Call 800 255-5550 Ext 400 for the name of the Hercules dealer nearest you and we'll rush you our free info kit.



Hercules.
We're strong on graphics.

Address: Hercules, 2550 Ninth St, Berkeley, CA 94170 Phone: 415 540-6000 Telex: 754063. Trademarks/Owners: Hercules/Hercules Computer Technology; Lotus, 1-2-3, Symphony/Lotus Development; Framework, Ashton-Tate/Ashton-Tate; IBM, AT/IBM; Microsoft/Microsoft. *The IBM Color/Graphics Monitor Adapter.

CIRCLE 145 ON READER SERVICE CARD

Copyrighted material

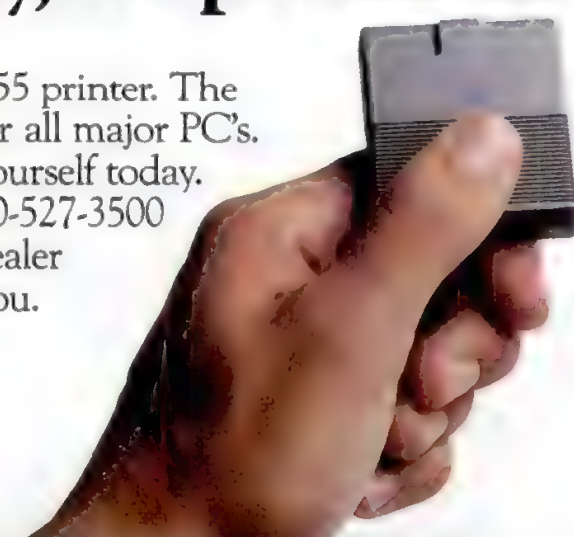
**The TI 855 is
the only printer
with letter quality,
draft speed,
graphics,
plug-in font
modules...
all for under
\$1000.**

(suggested retail price)



Finally, the printer for all PC needs.

The TI 855 printer. The
printer for all major PC's.
See for yourself today.
Call 1-800-527-3500
for the dealer
nearest you.



**TEXAS
INSTRUMENTS**



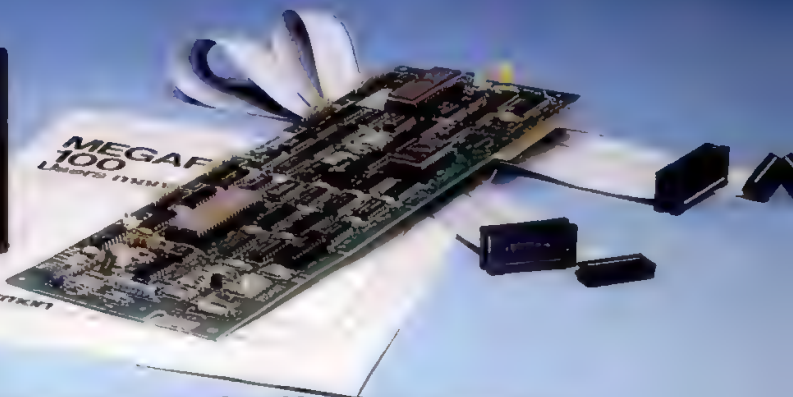
Creating useful products
and services for you.

FOR THE IBM® PC, IBM® XT, COMPAQ™
CORONA™ CORONA™ PORTABLE, LEADING EDGE™, EAGLE PC™, TAVA™



10 Mbyte Hard Disk System

~~\$895~~ \$695



Kamerman Labs combines the speed and storage capacity of hard disk technology with prices you can't afford to pass up.

A dramatic leap in performance for your personal computer.

Even the smallest Kamerman Labs hard disk unit gives you 30 times the storage capacity of a typical floppy disk. Sophisticated business and professional data storage requirements can now be handled with ease.

Better yet, you can access data up to 10 times faster than with floppies. Spend more time working and less time waiting.

And it's easy to use. Kamerman Labs lets you boot directly off the hard disk, just like the IBM XT.

A complete backup solution.

Backup of hard disk data is a critical requirement in many microcomputer applications, so Kamerman Labs offers several reliable and cost-effective backup devices that are fully compatible with our hard disk units.

Lower prices than ever.

Because you deal directly with Kamerman Labs, we offer you remarkably low prices. Finally, you can realize the full benefits of hard disk technology without the excessive costs.

Tested and formatted.

All Kamerman Labs systems have been thoroughly tested and formatted before delivery.

Full warranty and technical support.

Kamerman Labs backs all its products with a full one-year warranty on both parts and labor. Plus you get prompt technical support through a toll-free hotline number.


**To order, call toll-free
800-522-2237.**

In Oregon, Hawaii and Alaska call
503-626-6877.

IBM is a registered trademark of International Business Machines Corp.
Compaq is a trademark of Compaq Computer Corp.
Corona is a trademark of Corona Data Systems.

Leading Edge is a registered trademark of Leading Edge Products, Inc.
Eagle is a registered trademark of Eagle Computers.
TAVA is a trademark of TAVA Corporation.

All Kamerman Labs Units come in either internal or external configurations.

 **Kamerman
Labs**

CIRCLE 317 ON READER SERVICE CARD

8054 S.W. Nimbus, Bldg. 6, Beaverton, Or 97005
Phone 503-626-6877

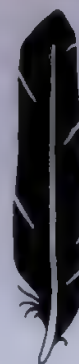
Of course you can't do seven things at once, but your computer can



...with WindowMaster.™

Now your computer can handle up to seven applications at once with Window Master — the exciting, new multitasking, windowing system. Balance your books, perform spread sheet calculations, print your color graphics, and input information into your data base...simultaneously. WindowMaster integrates all the popular industry packages and allows them to exchange data. Let your computer work for you.

- Multitasking — runs MS™DOS and CP/M-86® applications concurrently
- Lets you use the software of your choice — Lotus 1-2-3™ WordStar™ dBASE™...
- Includes full business graphics — color or B/W bar, line, and pie charts
- Simple interwindow data transfer
- User-definable application menus
- Programmable function keys
- User-created "scripts" perform repetitive or complicated tasks.



**Indian Ridge
Enterprises**
Incorporated

Retail
415/ **268-1488**

OEM
415/ **268-1631**

508 Second Street
Jack London Square
Oakland, CA 94607

WindowMaster is a TM of Indian Ridge Enterprises, Inc. Lotus 1-2-3 is a registered TM of Lotus Development Corp., WordStar is a registered TM of MicroPro International Corp., dBASE III is a TM of Ashton-Tate, CP/M is a registered TM of Digital Research, Inc. MS-DOS is a registered TM of Microsoft Corp., IBM-PC is a registered trademark of International Business Machines, Inc.

Available for the IBM PC, AT, XT, jr.,* and true compatibles

CLEAR THE DESK, SIDEKICK'S HERE!

*The Super
Organizer*

ALWAYS JUST A KEYSTROKE AWAY . . .

No matter what software you're running!

WHETHER YOU'RE RUNNING LOTUS, WORDSTAR,
dBASE OR WHATEVER . . .

JUST A KEYSTROKE AND A SIDEKICK WINDOW OPENS . . .

- A CALCULATOR
- AN APPOINTMENT CALENDAR
- A NOTEPAD
- AN AUTO DIALER
- A PHONE DIRECTORY
- AN ASCII TABLE



**IF YOU USE A PC,
GET SIDEKICK FOR \$5.95!
NEEDS NO OTHER SOFTWARE ON IT!**
© 1988 Franklin

\$54.95

copy-protected

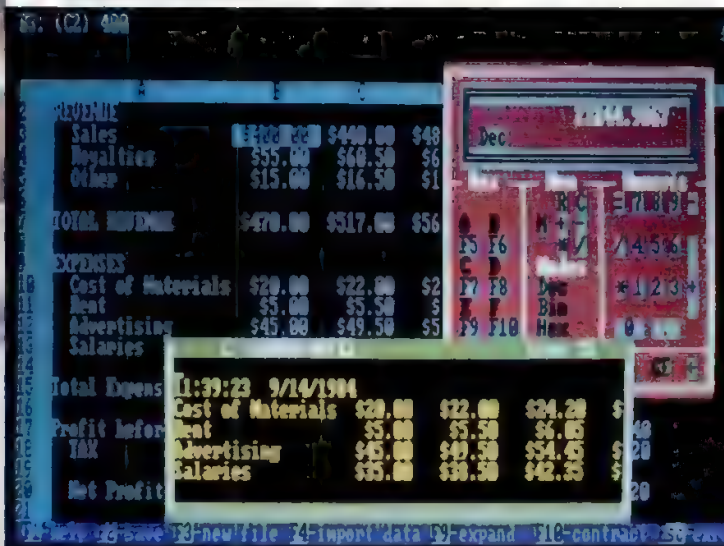
\$84.95

noncopy-protected



**30 DAY
MONEY-BACK
GUARANTEE**

Here's Sidekick in action. That's Lotus 1-2-3 running underneath. In the Sidekick Notepad you can see data that's been imported from the Lotus screen. On the upper right, that's the Sidekick Calculator.



NOW... Whether you're working in dBase, Lotus, Wordstar or whatever... you can unleash the full power of your computer... and make a lot of extra space on your desk at the same time.

Whenever you're using your computer... from start to finish of your session... Sidekick™ will be there... ready to serve. And it's as lightning-fast and compact as only Borland knows how to make it.

There's a notepad that has a full-screen editor that can time and date stamp your notes, and then save them to disk. You can even pull information into the notepad directly from the screen of your "underlying" software.

Suppose you're working in Lotus and the phone suddenly rings. Give your Sidekick a call and it pops right up over Lotus with the notepad you need. Or an appointment calendar... one you can never misplace.

What if you need to do a quick calculation? A keystroke instantly brings up the calculator. And the results of your calculations can even be transferred to your "underlying" software.

Need to make a phone call? Up pops your personal phone directory. Type in the name you want... and Sidekick jumps right to the phone number. Another keystroke, and the phone is automatically dialed for you.†

There's lots more, too. You can move the Sidekick windows anywhere on the screen you like. And you can have as many on screen at a time as you need. There's even an on-line help window for each of Sidekick's features.

We designed it because we needed it. If you've ever been writing a report and needed to do a quick calculation, or jot down a note, then you need Sidekick, too.

†Only with Hayes Smartmodem and compatibles.

GOT YOUR SIDEKICK™ YET?

SIDEKICK IS AVAILABLE AT YOUR NEAREST SOFTWARE DEALER, OR DIRECT FROM BORLAND.

For VISA and MasterCard orders, call 1(800) 255-8008; in California call (800) 742-1133.

Lines are open 24 hours a day, 7 days a week.

_____ \$54.95 SideKick
copy-protected

_____ \$84.95 SideKick
noncopy-protected

(Prices include \$5 shipping and handling per order.)

Check ☐ Money Order ☐

VISA ☐ MasterCard ☐

Card # _____

Expiration Date _____

Please be sure your system is an IBM PC, AT, XT jr. or a true PC-compatible. PCjr. users must order noncopy-protected version.

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

TELEPHONE _____

California residents add 6% sales tax. Outside USA add \$10; payment must be by bank draft payable in the US and in US dollars. COD and purchase orders will not be accepted. \$ 7

**BORLAND
INTERNATIONAL**

Borland International
4113 Scotts Valley Drive
Scotts Valley, California 95066
TELEX: 172373

CIRCLE 150 ON READER SERVICE CARD

When all else fails.

Most diskettes are pretty good.

And some of the time that's good enough.

But next time you throw away one that won't format or you lose the cash flow analysis you've been working on for weeks, make a mental note to try a box of Dysan diskettes.

They're better.

So much better, in fact, that major computer manufacturers put their names on our diskettes and sell them as their own.

Without fear of failure.

You see, we make our diskettes better with advanced manufacturing processes that our competitors have yet to figure out.

And we test them.

Almost to the point of absurdity.

Dysan diskettes are inspected almost a hundred times as they come down the line. They're tested to performance levels way beyond industry standards. And each one is certified to be 100 percent error free.

Then our corporate quality assurance fanatics come along and check them all over again. For all

the same things. Plus some things only they understand.

When we're done, you get exactly what you wanted in the first place. Diskettes that will record and retain all your data all the time.

We don't expect you to keep all that in your mental note, but we would like you to remember your last diskette failure.

And when your computer products dealer offers you another box of pretty good diskettes, tell him you're ready for something better.

Dysan.

Call toll free for the name of the Dysan dealer nearest you. (800) 551-9000.

Dysan Corporation, 5201 Patrick Henry Drive, P.O. Box 58053, Santa Clara, CA 95050, (408) 988-3472.

Dysan®

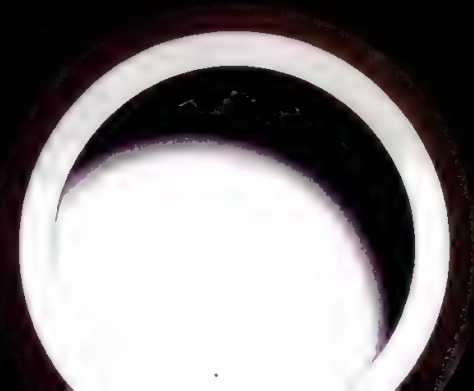
**Somebody has to be better
than everybody else.**

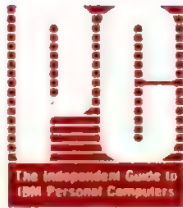
CIRCLE 289 ON READER SERVICE CARD

Dysan is a registered trademark of Dysan Corporation. © 1984, Dysan Corporation

Dysan

Flexible Diskette





What's Inside

To create the illustration for this issue's cover, PC's art directors got their mitts on some of the video boards and equipment we reviewed. But will they ever let them go?

It will come as no surprise to those of you in the publishing business that the art and editorial departments here at *PC Magazine* sometimes disagree. In fact, the skirmishes between those who favor the word and those who create the image occasionally blow up into major battles. After all, which is more important to a product review: a paragraph that examines in minute detail all the possible uses of a chip that may someday be invented, or an abstract illustration portraying the artist's conception of PC-DOS?

Harmony

However, this issue's cover illustration was definitely something on which the editorial and art staffs happily agreed. Its unique conception and execution make it especially interesting. (Those of you who only read this column so that you can snicker at our foul-ups and omissions can stop here.)

According to art director Gerard Kunkel, we could have produced the cover art in two ways. "We could have gone to an outside firm and asked it to create the image for us," he explains. "But then we would have lost creative control. Or we could have done it conventionally by faking the appearance of a video image—but that would have been a disservice to our readers."

Instead, design director Peter Blank



and art director Mary Zisk realized that they had, in house, all of the equipment that was necessary to create a high-resolution, reproduceable image—the very same collection of video boards we had already assembled for this issue's cover package. With the help of technical coordinator and toy shop factotum Mike O'Cone, the art department put together a super-duper deluxe video system composed of an XT with 512K and a multi-function board, a monochrome display adapter with a parallel port, a Chorus Data Systems PC-EYE board to do the video capture, a Chorus Data Systems Colorverter to fine-tune the video picture and capture color, a Number 9 Corporation

Revolution board to drive the high-resolution graphics monitor, a Microsoft mouse to manipulate the menus, and a JVC video camera with zoom lens.

Face Value

The original art department concept was a video image "painted on" a monitor. "We wanted to use a face," explained Kunkel, "because that's the best representation of what a video capture system is able to do."

Incidentally, the face on the cover is not that of a professional model but that of one of our assistant art directors who had served as a test model to allow the art staff to preset the computer for flesh tones. However, a video digitizing camera doesn't often convey the subtleties you get with a conventional camera. Therefore, says Kunkel, when the professional model was photographed, "her flesh tones were so nice and even that she went completely flat. When we realized the model was not working out nearly as well as tested the day before, we brought our original test model back."

Once they had a usable image, Kunkel did some minor retouching to make it look a little bit more lifelike. He darkened the line on the eyes, brightened the color inside the iris, and made the lipstick redder. "It was done with Chorus Data's *IMiGIT* software," he says. "The interesting

WHAT'S INSIDE

thing about *IMiGIT* is that it's built upon Media Cybernetics's *Halo* primitives, routines that enable the computer to carry out such functions as filling in an area with a

color."

Freelance photographer Dennis Kitchen photographed the final image in the conventional manner from an Electro-

home high-resolution analog RGB monitor. The image was then sent to a composition house that combined the photographs of the monitor, the video image, and the paperhanger. After some slight retouching to get rid of awkward edges, the cover art was ready.

Fine-Tooth Comb

The *raison d'être* for all this artistic creativity is a set of fine cover stories on video boards based on thorough hands-on reviews by *PC* regulars Glenn Hart and

HOW DARE SBT GIVE AWAY ITS SOURCE CODE!



The Secret's Out

Most software companies keep their source code top secret. (The source code is the set of commands that make a computer perform a given task.) But SBT doesn't keep any secrets—instead we freely give away our dBase Accounting Source Code so you get the control and flexibility that's crucial to a well run business.

When there are no secrets, you can add a special part number system or change a report at will—the possibilities are endless. That's why SBT Accounting Software can change and grow with your business needs. You can make the changes yourself or SBT will do it for you quickly and inexpensively.

Integrated or Stand Alone

Start with the modules you need now, and add the others later. Best of all, SBT Software works on all computers that can run dBase II or dBase III.

.dOrder	Sales Order Processing	\$195
.dInvoice	Billing/Inventory Control	\$195
.dStatement	Accounts Receivable	\$ 95
.dPurchase	Purchase Order Processing	\$195
.dPayable	Accounts Payable	\$295
.dPayroll	Payroll/Labor Accounting	\$395
.dLedger	General Ledger/Finance	\$395
.dAssets	Asset/Depreciation	\$195
.dProject	Project/Job Accounting	\$345

. Demonstration disks available.

Call SBT at 408-980-8880 for more information

SBT Corporation
1140 Mountain View-Alviso Rd.
Sunnyvale, California 94089

*dBase II and dBase III are registered trademarks of Ashton-Tate

Now Available
for dBase III*



"We could have gone to an outside firm and asked it to create the image for us, but then we would have lost creative control."

Jim Fomey. The 25 boards they looked at range from sophisticated graphics boards to PC color/graphics board clones—in fact, every new piece of hardware that the authors could possibly lay their hands on. (According to Hart, "If it's a video board and you could plug it in, we asked the manufacturer for it.")

In addition, David Powell explores how PC graphics can be used in broadcasting, and Jim Fomey reviews the PC-EYE Video Capture System. The art department does, of course, fully intend to give back the system now that it's finished playing with it. Our art directors would *never* hold on to it any longer than they absolutely needed to. There are, perhaps, a few short tests they still need to perform. It may take them another day or two, maybe several weeks, but they will return it. Eventually. ■

CIRCLE 470 ON READER SERVICE CARD

For all those times you've wished your PC could speak and listen



...your wish just came true.

No buttons to punch. No screens to touch. No mouse to point. If you can speak and listen, that's all you need to communicate with your IBM® personal computer. At last you can concentrate your eyes, hands and mind on what you're doing without constantly stopping to input data into your PC.

The reason? NEC's SAR-10 "Voice-Plus", a fully integrated speech recognition and audio response plug-in



board compatible with the IBM-PC.
Now, simple commands like "go"

and "print" eliminate the many keystrokes previously required to run your computer programs. Verbal inputs are digitized (a custom LSI chip set gives SAR-10 a 250 word vocabulary) and ASCII outputs are transmitted to the computer. Your system speaks in a surprisingly human voice as well as reproduces other sounds to guide and prompt you through the program, verify your inputs and warn you about errors. Your IBM-PC never sounded so good!

Imagine what this hands-free interactive communication means for your computer application. Faster, easier, more accurate results for virtually any office or factory task, including sorting, data entry, robotics control, inventory and product inspection. Or

for financial, medical, architectural and graphics applications. In fact, any procedure that benefits from more energy spent on the work itself and less on the computer.

Stop wishing, because now it's here. And it's affordable. The NEC SAR-10 "Voice-Plus". Other configurations are also available. For more information, contact **NEC America, Inc.**, New Products Dept., 8 Old Sod Farm Road, Melville, NY 11747 at (516) 753-7000 Ext. 7362

NEC
NEC Corporation

PC BRAND's CRAFTSMANTM TOOLS FOR "C" SHOPS

C CROSS COMPILERS

Portability to 16-Bit Just Got A Lot Easier

PC BRAND now carries an assortment of cross compilers to move products from larger host machines to the PC-DOS or MS-DOSTM environment. Take a glance at the list below.

Cash in on products already developed on your bigger machines by rapid transit to the burgeoning world of PC owners.

MS-DOS or PC-DOS Target:
VAX/VMS Host
VAX/UNIX Host
MC68000/UNIX Host
Altos 586 Host
Hewlett Packard-UX

Or take advantage of big machine services and utilities to do development work for the PC market, and only then download the results. A quick mental calculation will convince you that productivity gains will quickly trade off these costs. Each is custom-made to your specification. Call for availability.

Product Code:	Price:
L10VM#	\$5000
L10UX#	5000
L1068#	3000
L10AL#	3000
L10UX#	3000

Expand Your Sales to the CP/M World

They have vanished from the headlines, but there are over a million CP/MTM machines still humming across the land. Yet *InfoWorld* reports that "there's no new CP/M software". If you are part of the problem, here's a

money-making way to become part of the solution. Convert your MS-DOS PC-DOS products with our CP/M-Z80 targeted cross compiler. For a few dollars, you'll double your market in a hurry.

CP/M-Z80TM Target:
MS-DOS or PC-DOS Host

Product Code:	Price:
L2Z80#	\$500

C-SPRITE

Lattice's Own Debugger for Lattice[®] C

This versatile companion to your compiler gives you the best of both worlds for an out of this world price. Hand it a COM or EXE file produced by the Lattice Compiler (using the -d option) and C-SpriteTM will speak your language: your function names, your variable names, your data types, and the line numbers from your source code. At the same time, if you want to scrutinize just what machinations the compiler (or an assembler) has contrived, you can get a close-up view of machine addresses and machine coded instructions.

You can set simple breakpoints using symbols or addresses, or submit clusters of commands to be executed at the breakpoints, or set commands that execute until a condition is met.

You already know how to converse with C-Sprite, if you are familiar with Microsoft's Debug. Lattice began with that well-known command language, and then added to it considerably: You can work with data in hex, as you might expect, and you can also differentiate between C's data types, causing the debugger to treat addresses as pointers, or strings, or long integers, etc., both in display and entry. C-Sprite even has macros — use your source code variable names in a macro to dump the contents of entire C structures, for example. And you can debug through one of the COM ports with a second terminal so as not to disturb your program's display screen. What's more, if you link with Plink86TM, C-Sprite can even tackle overlays.

Program doctors will find plenty of implements to rummage through in this kitbag.

Product Code: L2300#	Price:
	\$175

PC BRAND, Craftman, Toolbox and ToolshedTM
PC BRAND • Unix[®] Bell Laboratories • Lattice
C • C-Font Smorgasbord, Lattice Window, LMK,
C-Sprite, and dB-C[™] Lattice Inc. • MS[®] Microsoft
Inc. • Halo[™] Media Cybernetics • IBM[®] International
Business Machines • Float87[™] Microfloat • Panel[™] Roundhill Computer
Systems Ltd • Plink86[™] Plink86, and Pmate[™]
Phoenix Software • CP/M[™] Digital Research •
dBASE[™] Ashton-Tate • VAX[™] and VMS[™] Digital
Equipment Corp • Z80[™] Zilog Inc.

WE ARE EXPERTS IN EXPORT

PC BRAND ships all over the world. We'll prepare the export documents and ship to you or your agent at the port of entry you specify. Phone (212) 410-4000 or Telex 667962 (SOFT COMM NYK) with your order and preferred shipping method. We will compute the total charges for you to prepay by funds wired to Chemical Bank, 126 East 86th St., New York, N.Y. 10028, Account #: 034-016058, and your products will be shipped immediately.

dB-C

Switch from dBASE to C for Power and Speed

There are a lot of dBASE[™] file users out there. Most just maintain data bases and use dBASE's limited reporting facilities. They're not programmers, so they don't use the dBASE programming language. But they'd like a greater return on their efforts, and that's a business opportunity that makes this product important to you.

dB-C[™] links C to dBASE. It creates files which exactly replicate dBASE file design. So dBASE can read and update them. And the reverse. dB-C can use any files created by dBASE. Now C and dBase can operate on the same data bases interchangeably.

This opens up the widespread culture of dBASE installations to exploitation. As a C programmer, you can replace the resident dBASE language with speed! Both C's and your own: you no longer

Two Versions:
Dbase II Compatibility:
Dbase III Compatibility:

TEXT TOOLBOX[™] #1

These Utilities Work Wonders of Organization

Welcome to "grep", "wc", "ed" and "diff", tools you will reach for as routinely as "copy" once you come to know them. Unix[™] boasts a number of muscular utilities that are migrating to

CVUE

A Text Editor to Make Your Own

CVUE is a neat screen oriented text editor which does most of the things that a good editor should do, such as automatic scrolling vertically and horizontally, insertion and overwrite entry modes, block delete, undelete and move, and full DOS 2.0 directory path name support in reading and writing files.

It is easy to learn with a comprehensive command menu screen which makes the documentation an ornament. It was written by the Lattice programmers who felt forgotten by the folks who write WP software. They needed easy entry of non-display characters such as control codes and escape sequences, not footnotes. Indenting and Undenting of block structures loomed larger than italic printing for them. Pattern searching won out over spell checking. So CVUE was born.

CVUE has its limitation. It only supports in-memory text files, but with memory at today's prices, creating and maintaining files of over 500 KBytes long is practical. Anyway, modular source code of structured programs never gets nearly that big. As compensation, CVUE is very compact and fast. It actually runs in computers with only 64 KBytes of memory and uses no tediously slow overlays to perform its full function repertoire.

The power of CVUE is its ease of customization. Even with only a binary license, full customization of the keyboard editing commands is offered. And when you take advantage of the Source Code option (found elsewhere in this ad.) the resultant editor can be made truly your own.

Product Code: L2240#	Price:
	\$100

the PC world. Lattice has assembled this cluster of the most useful text management tools into a single package.

"Grep" looks for text patterns in any number of files. Its powerful expression syntax goes far beyond your text editor's search command. Use of "(. +)" with "*.c" will find in all files with ".c" extensions all lines with parenthesized expressions, no matter how many characters lie between. Want to find all function calls? Look for all occurrences of, say, a global variable throughout a program system? Search for all programs in a directory, use paths to other directories? Find all files on a disk? "Grep" will grab them all.

"WC" counts lines, words, and characters in a file and has a checksum independent of machine character sets so you can test whether a file has been transferred successfully between computers.

"Ed" is similar to the well-known Unix editor. It offers search and replace with "Grep's" syntax, block move, read and write, optional line numbering, append, insert, delete, and this unusual facility: you can instruct "Ed" to apply a file of commands to any number of target files, even complicated changes and text additions, such as those created by "Diff".

"Diff"? You've probably tried to write one (and then discovered how tangled the logic gets). "Diff" compares text files line for line and reports differences. It uses complex algorithms to re-synchronize between files after disparities involving any number of lines are found. And it outputs a precise list of instructions telling what to do to make two files exactly the same, a list which can be handed to "Ed" to do the job!

You'll ultimately find such assistance indispensable. Like having a librarian to sort out the confusion every day and keep your work tidy.

Product Code: L2220#	Price:
	\$120

CURSES

A Screen Management Interface to Swear By

Curses manages the screen of the IBM PC in the same fashion as the curses utility of Unix and similar operating systems. Use it to adapt programs which call Unix's curses functions for screen management, and need the equivalent library when moved to the PC for re-compilation. Or use it when creating software on the PC to assure that it is Unix compatible.

Curses is a library of eighty-four functions and macros which can keep any number of screen images in memory.

Within a screen, Curses employs a vast function set to get characters, wrap lines, scroll, blank lines, highlight — virtually every tool needed to update the screen. The product supports color, and all four memory models. In keeping with the terminal orientation of Unix curses, the physical screen is re-painted (at high speed) only when your program calls a refresh function.

Writing screen management code leads to unspeakable snarls and expressions. Swear off! Let Curses clean up your language.

Product Code: L0850#	Price:
	\$125

PRECISION SOFTWARE FOR PROGRAMMERS

SUPPORT DIRECT FROM LATTICE

Products with codes beginning "L" are all fresh from Lattice Inc., the premier software developer serving the C professional marketplace. PC BRAND has made special arrangements for Lattice to provide telephone support for these products directly.

Take advantage of this unusual opportunity. Buy from PC BRAND, and you get to talk to the experts themselves!

30-DAY MONEY-BACK GUARANTEE

It gets better. We will return the purchase price of any "L" or "N" coded product offered in this space if you decide it fails to meet your needs. You read that correctly. We want you to be completely satisfied with your purchase. Go through the manuals, *try out the products themselves*, and make a thoroughly informed decision whether they are right for you.

There are rules: We can make this offer in the U.S. and Canada only. For you to be eligible for refund or credit, we must receive your returned product within 30 days of its shipment. Everything but the packing must in our judgment be in 100% resaleable condition.

(a) Subject to terms and conditions of sale. (b) Not shipping and handling.

CODE SIFTER

Find the Hot Spots in Your Program

Fast is never fast enough; only miracles need apply. That's what's expected in today's marketplace, so our Code Sifter is an important tool to add to your workbench.

Code Sifter finds the trouble spots in your program. On its own, it will divide a COM or EXE file of any size into thirty-two equal partitions. Alternatively, you can specify the partition boundaries with addresses, or with symbols if your linker has produced a symbol map. Then tell Sifter to run your program. It samples your object file at precisely timed intervals and counts how many times it finds the instruction pointer in each partition. Job done, it reports the number and percentage of hits in each partition.

You are in for some surprises when you discover just how unbalanced the activity is likely to be, and that's why Code Sifter is so valuable. It profiles just where you can best spend time optimizing your code, or even converting to assembler subroutines.

Code Sifter has a number of monitoring options. You can tell it to include any combination of your program, DOS, and BIOS in its analysis. You can specify the sampling rate. Most important, you can tell Code Sifter the number of times to run a program, and between each run discard the less active ranges and re-partition the hot spots, so that you zoom

in ever tighter on small areas of code. Right down to the last byte! Literally. Try it on the sample program that comes with your disk.

Code Sifter. It will give you the racer's edge.

Product Code: N3100# Price: **\$119**

SOURCE CODE FOR SALE

Designer Originals For Your Special Needs

"One size fits all" turns away disappointed customers. When you cannot shoehorn your application into out-of-the-box software, we have the solution. For each of these products only, PC Brand now licenses source code, provided you buy (or have already bought) from us the object code counterpart. Take it in, let it out, and make it fit snugly to your needs. And, if you are new to C, you will learn a lot apprenticing this fully documented code from top designers.

Lattice C Compiler Library
for MS-DOS/PC-DOS
for Z80
C-Food Smorgasbord Library
Curses Library
dB-C Library
for dBase II
for dBase III
CVUE Screen Editor
Text Toolbox #1

Product Code:	Price:
L9100#	\$500
L910Z#	500
L9200#	500
L9850#	125
L9011#	250
L9111#	250
L9240#	350
L9220#	120

LMK

A Unix-like "Make" Makes Light of System Building

USED COMPILERS WELCOME

Trade In for the Latest Model Lattice C

Has your compiler run out of gas? Has your model been discontinued? Is it falling behind for lack of new parts?

Even if yours is in good shape, you have surely noticed there are more options and accessories produced to run with the Lattice C Compiler than any other. Don't do without these additives any longer. It's time for new license plates. Trade in your original disks and manual of any of the compilers below and we'll send you Lattice's most up-to-date model, the full bore 2.14 (at press time).

From then on you will be adopted by Lattice for full, direct support by their technical specialists.

Product Code LU150:	Price:
Microsoft MS-DOS/PC-DOS C	\$150
Product Code LU200:	
Computer Innovations C86	\$200
Manx Aztec C86	200
Mark Williams C	200
Wizard C	200
Digital Research C	200
Whitesmith's C	200

If you have ever built a complex system, you know the time loss and tedium of recompiling, rebuilding libraries and relinking modules because a snippet or two of code has changed. Batch files are no answer. You need batches of them to avoid redoing everything indiscriminately.

Instead, imagine making a change deep in a system, and simply telling Lattice's LMK™ to take over. No further thinking or keystrokes. LMK will rebuild your final product, however involved and complex, by doing just what is needed and no more.

How? You write a command file which expresses bottom to top all the elements comprising your system and all its dependencies: what gets compiled to make what object file using what options; what is built into libraries; what is linked into the final EXE file. Through the life of your system, LMK keeps track of the last time every action was performed. Run LMK and, tracking each branch, it looks only for elements which changed later than a dependent element further along the branch, using date and time information found in the file directory. Any source file newer than its object file, for example. Only those elements and their dependents are remade. All other instructions are bypassed.

The command file uses a simple, readable syntax — "prog.obj: prog.c \$(HDRVS)", for example, says what source file this object file depends on, and fills the previously defined macro HDRVS into the expression, which here might be a list of files with hardware drivers, or in another case your preferred string of compiler options.

LMK does not care what programming language you use; it's not just for C. For that matter, LMK can apply to more than programming. It can be used for any set of tasks which can be accomplished through commands issued to the operating system. Try it for repeated re-assembly of lengthy documentation, or for selective re-consolidation of spreadsheets so that only dependents of changed supporting schedules get recalculated.

Wherever your imagination leads you, LMK will find the shortest path to get the job done. Minimum time, minimum effort software.

Product Code: L2100# Price: **\$195**

TERMS AND CONDITIONS OF SALE

Licenses: Each price is for a license to use a product on a single computer and does not constitute product ownership. Ask about availability of other terms for multiple machine use at a single site. Products coded "M" may be used to create programs for distribution without royalty payments or additional licenses, provided said programs do not substantially replicate the products themselves.

Compatibility: PC BRAND's standard products are designed to operate with the IBM PC, PC XT or AT under PC-DOS and require no more than 128K of RAM unless indicated.

Return of Non-L-Coded Products: Acceptance for refund or credit only by prior

authorization subject to a re-stocking charge. Software diskettes are delivered in sealed envelopes and are unreturnable if seal is broken. Defective products will be replaced in whole or part.

Payment: We honor MasterCard & Visa (no surcharge), wired funds, checks in advance, and COD for cash or certified check (\$5 fee). Purchase orders accepted from corporations and institutions at our discretion; 2% per month added to balances unpaid after 30 days.

Shipping & Handling: U.S.: UPS Surface: 1st product \$6, each add'l \$3.00. UPS 2nd Day Air: 1st product \$10, each add'l \$4.50. UPS Next Day Air or Federal Express: 1st product \$18, each add'l \$6. International: Charges dependent on destination and method of shipment.

We're as Near as Your Telephone. Call us at...

800-PC BRAND

P4

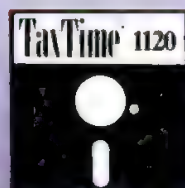
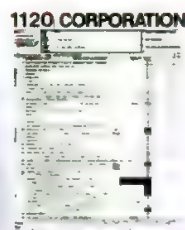
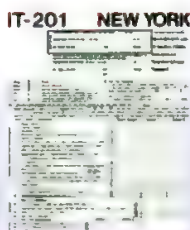
That's (800) 722-7263. In NY State call (212) 410-4001.

PC Brand, 345 E. 86th St., New York, N.Y. 10028

CIRCLE 141 ON READER SERVICE CARD



or



*"Nothing I have ever
seen is so powerful, so
fast, and so easy. \$95
is too little."* - Many, many CPA's

Taxtime is a highly integrated tax preparation program for use as a template with Lotus 123 and Symphony. It takes only 10 seconds to recalculate all forms, is easy to use, and is IRS approved. Federal 1040 and state forms are \$95.00, corporate returns are \$195, and annual updates are only \$45 to \$75. All programs require Lotus 123 version 1A and 256Kb or more memory. To order programs or free detailed catalog phone

800-227-2634 ext 998, or in Calif 800-772-2666 ext 998.

TaxTimeTM
FOR 1-2-3

A product of Austin Scientific, Inc.
1259 El Camino, Suite 260
Menlo Park, CA 94025
Dealer inquiries welcome.

CIRCLE 114 ON READER SERVICE CARD

123 and Symphony are trademarks of Lotus Development Corporation.

NEW from BORLAND! TURBO TOOLBOX & TURBO TUTOR

"TURBO is much better than the Pascal IBM sells."
Jerry Pournelle. Byre. July 1984

"If you have the slightest interest in Pascal—buy it."
Bruce Webster. Softalk IBM. March 1984

*Offer extended by
popular demand!
Get your Borland Holiday pack
by March 14, 1985.*

BORLAND INTERNATIONAL GIFT PACK

ONLY
\$99.95
A SAVINGS OF \$30!

What a gift for you and your friends! The extraordinary TURBO PASCAL compiler, together with the exciting new TURBO TOOLBOX and new TURBO TUTOR. All 3 manuals with disks for \$99.95.

TURBO PASCAL Version 2.0 (reg. \$49.95). The now classic program development environment still includes the FREE MICROCALC SPREAD SHEET. Commented source code on disk

• Optional 8087 support available for a small additional charge

NEW! TURBO TOOLBOX (reg. \$49.95). A set of three fundamental utilities that work in conjunction with TURBO PASCAL. Includes:

- TURBO-ISAM FILES USING B+ TREES. Commented source code on disk
 - QUICKSORT ON DISK. Commented source code on disk
 - GINST (General Installation Program)
- Provides those programs written in TURBO PASCAL with a terminal installation module just like TURBO'S!
- NOW INCLUDES FREE SAMPLE DATABASE

NEW! TURBO TUTOR (reg. \$29.95). Teaches step by step how to use the TURBO PASCAL development environment—an ideal introduction for basic programmers. Commented source code for all program examples on disk.

CIRCLE 149 ON READER SERVICE CARD

30 DAY MONEY BACK GUARANTEE

Available at your nearest software dealer.

For VISA and MASTERCARD order call toll free:

1-(800)-255-8008 1-(800)-742-1133

(Lines open 24 hrs., 7 days a week)

Dealer and Distributor inquiries welcome (408) 438-8400

CHOOSE ONE (please add \$5.00 for handling and shipping U.S. orders)

_____ All Three-Gift Pack	\$ 99.95 + 5.00 SPECIAL!
_____ All Three & 8087	139.95 + 5.00 SPECIAL!
_____ Turbo Pascal 2.0	49.95 + 5.00
_____ Turbo Toolbox	49.95 + 5.00
_____ Turbo Tutor	29.95 + 5.00
_____ Turbo 8087	89.95 + 5.00

Check _____ Money Order _____ VISA _____ MasterCard _____

Card #: _____ Exp. date: _____ Shipped UPS

My system is: 8 bit _____ 16 bit _____

Operating System: CP/M 80 _____ CP/M 86 _____ MS DOS _____ PC DOS _____

Computer: _____ Disk Format: _____

Please be sure model number & format are correct.

NAME: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

TELEPHONE: _____

California residents add 6% sales tax. Outside U.S.A. add \$15.00 (if outside of U.S.A. payment must be by bank draft payable in the U.S. and in U.S. dollars). Sorry, no C.O.D. or Purchase Orders.



4113 Scotts Valley Drive
Scotts Valley, CA 95066
TELEX: 172373





Statpro Professionals.

People who want to spend their time analyzing results, not just crunching numbers.

Statpro™ data analysis software was specifically created to give professionals of all kinds the analytical tools they need on the job.

It's for corporate planners and marketing specialists, engineers and lab technicians, scientists and educators. In fact, Statpro is for every professional who does data analysis but can't afford to waste time.

Mainframe statistics on your PC.

As a practical tool for professionals, Statpro was specially designed for the personal computer. It's not a scaled-down mainframe program or one of those packages that can only handle a few basic analyses. Instead, it brings a full repertoire of statistical techniques to your IBM PC or PC/XT. From basic descriptive statistics and linear regressions to unequal size ANOVA and discriminant function analysis.

And despite its impressive power, Statpro is easy to use. You just respond to simple menus and screen prompts with single keystrokes. No programmers,

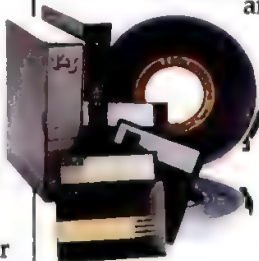


Single keystrokes are all it takes to put Statpro to work.

complex commands or long lines come between you and the job.

A powerful database.

Because you'll want to set up your analyses according to your needs, we've equipped Statpro with a remarkably flexible database. You can range check, verify data entries and keep track of missing data. Analyze



Statpro exchanges data with many popular programs.

any subset of your database. Transform variables according to virtually any formula. And add, edit, delete, sort or move data wherever you want.

Chances are you'll also be using data from other sources. So Statpro is designed to allow you to easily exchange information with other popular programs and file formats, such as 1-2-3™, dBase II™, ASCII, DIF™ and SYLK™.

Lots of graphics.

Nothing makes complex data clearer and easier to present than pictures. So Statpro lets you create graphics and charts in the best format for each job, from pie charts, scatter and regression plots to bar, box and

multivariate vector plots. What's more, Statpro graphics can be customized—with scaling, labels and colors—to emphasize important aspects of your analyses.



Colorful graphics make complex data easy to understand.

Call for a demo. Statpro Professionals get more

done, faster. But don't take our word for it. Call and ask about our demonstration package, or order Statpro for only \$795.

Don't wait! Become a Statpro Professional today.

800-322-2208

In Massachusetts, call (617) 423-0420.

Call us for the dealer nearest you.

Wadsworth Professional Software

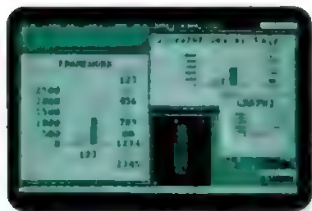
Statpro is a trademark of Wadsworth Professional Software, Inc. dBase II is a registered trademark of Ashton-Tate. DIF is a trademark of Software Arts, Inc. 1-2-3 is a trademark of Lotus Development Corporation. SYLK is a trademark of Microsoft Corp.

CIRCLE 521 ON READER SERVICE CARD

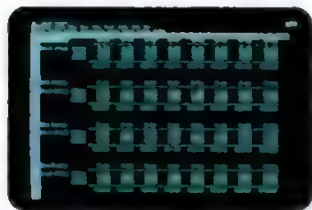
At last...Integrated Software, graphics, 132-column* display, expandability and much more for your IBM® Monochrome**...on an integrated board: UltraPAK™

Now PC/AT compatible!

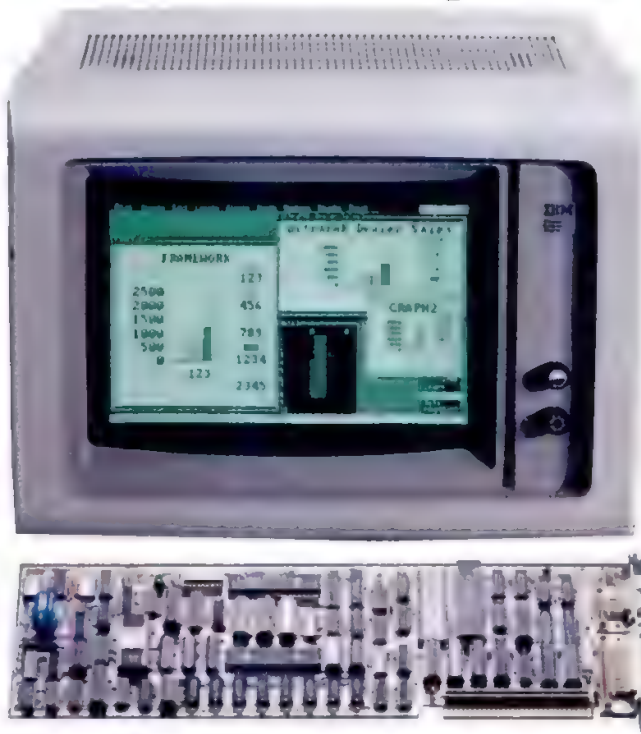
Ashton-Tate™ Framework™



Lotus™ 132 Column



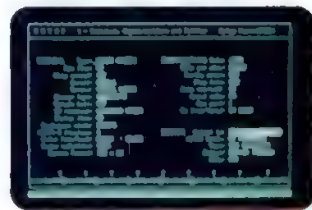
Color graphics on monochrome display



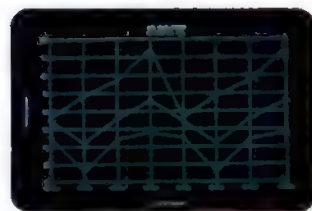
Lotus™ Symphony™



80/132 column VT100 Emulation



Lotus™ Graphics



UltraPAK™...Suggested Retail Price...\$680.
Call us for dealer nearest you **UltraPAK-S™*****...\$545.

Introducing the only board that does it all for your IBM PC™. In one slot. At low cost. The UltraPAK™: it's everything you ever wanted for your PC.

The powerful new generation of integrated business software requires much more than just an off the shelf IBM PC. UltraPAK™, from Tseng Labs, delivers everything else you, the business and professional user, need to fully support the new integrated packages like Symphony™, Framework™, and more. Graphics, Word Processing, Spreadsheet, Communications, Database, ... UltraPAK™ meets the hardware requirement head-on, and is truly in a class by itself as the first "integrated enhancement board". Compare for yourself!

Systems Supported: IBM PC, IBM PC/XT, IBM PC/AT, ITT XTRA™, Sperry™, Eagle PC™, TAVA™, Leading Edge™.

With Amdek 310A Monitor: Corona™, AT&T™, Compaq Portable™, Eagle PC Spirit Portable™, IBM PC Portable.

*Multiplan™, Word Star™, Word Perfect™, with FREE - Lotus 1-2-3 driver for 132 column. **IBM PC Compatible. ***UltraPAK-S, serial port and battery backed clock not available.

Lotus, 1-2-3 and Symphony are TM of Lotus Development. PC is a registered TM of IBM. Framework is a TM of Ashton-Tate. Multiplan is a TM of MICROSOFT. Wordstar is a TM of MICROPRO Intl. Wordperfect is a TM of Satellite Software Intl.

SINGLE BOARD COMPARISON

Integrated Applications	UltraPAK Integrated Board	IBM Monochrome Board
Graphics	720x348 Bit Mapped (2 page) Color Graphics Emulation on Monochrome Display	NA
Spreadsheet	80 Characters x 25 Lines 132 Characters x 44 Lines	NA
Communications	2 Serial Ports (1 Std. 1 Optional) connect modem, mouse, 1 Centronics Parallel Port (incl. print spool)	80 Characters x 25 Lines NA
Word Processing	IBM Compatible	1 Centronics Parallel Port
Database	Optional 384K System Memory Optional IBM Disk Controller Ram Disk Software	Standard
Clock/Calendar with battery	Standard	NA
384K Memory	Optional	NA
IBM Disk Controller	Optional	NA
UltraPLOT™ Graphics Software	Optional	NA

USER EXPANDABLE (one Option per UltraPAK board)

Distributed By:

Compuserve (Canada)	(416) 477-8088
F.A. Components	(800) 847-4148
Information Management Assoc.	(703) 771-6464
Manchester Equipment	(212) 895-4404
MBS (England)	(07535) 68171
Micro Brokers	(201) 766-5139
MICRO D	(800) 854-6801
Micro Distributors	(312) 843-0567
Micro Environments	(404) 662-0744
Stemmer Elektronik (Germany)	(089) 806061
Warehouse I	(800) 253-5330



Tseng Laboratories, Inc.

205 Pheasant Run, Newtown Commons, Newtown, PA 18940
(215) 968-0502 TELEX 705179

Enhancement technology for personal computers.

CIRCLE 540 ON READER SERVICE CARD

[illegible]

The IBM PCjr can run so many programs, chances are you'll never find yourself up in the air.

Unless that's where you'd like to be.

More computer for your money.

See how PCjr compares with other computers at its price.

Memory	Software
User Memory (RAM): 128KB (expandable to 512KB)	Runs over 1,000 programs written for the IBM PC
Permanent Memory (ROM): 64KB	Runs both diskette and cartridge programs
Diskette Drive	Display
Double-sided, double density	40- and 80-column
Capacity: 360KB	Resolution:
	4-color: 640h x 200v
	16-color: 320h x 200v
Processor	Expandability
16-bit 8088	Open architecture
Keyboard	Optional 128KB
Typewriter-style	Memory Expansion Attachment(s)
Detached; cordless	13 ports for add-ons, including built-in serial interface
Warranty	
1-year limited warranty	

You can use a PCjr to pilot your own aircraft with Flight Simulator. Or handle a business with the powerful Lotus™ 1-2-3,™ in its new cartridge format. Or create full-color illustrations with the new PCjr ColorPaint.

The fact is, PCjr runs over a

thousand of the most popular, current programs—many of them written for the IBM PC.

You can choose from over 50 programs to make writing a breeze.

Over 60 programs to help manage a home.

Over 200 programs to help manage an office.

Over 200 programs for entertainment.

Over 300 programs for education.

And a generous helping of programs to help you write your own programs.

And if you'd like more,

the new optional PCjr Memory Expansion Attachment gives you the power to run over a thousand additional programs.

With PCjr, you have access to one of the fastest-growing, most up-to-date libraries of software in the world today. So no matter what you do, it's likely that there's a program to help you do it better.

Whether it's flying through spreadsheets or flying through a 30-knot headwind.

Touch down at an authorized IBM PCjr dealer or IBM Product Center and take a look at PCjr—now priced at less than \$1,000,* monitor not included.

For the store nearest you, call 1-800-IBM-PCJR. In Alaska and Hawaii, call 1-800-447-0890. **IBM®**

IBM PCjr

Growing by leaps and bounds.

CIRCLE 276 ON READER SERVICE CARD



With Flight Simulator, you can practice your flying in Chicago or 89 other places. With or without the wind.

Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

*IBM Product Center price, monitor not included.

Little Tramp character licensed by Bubbles Inc., s.a.

*Give people the tools they need,
and there is no limit to what they achieve.*

*Announcing the first major
breakthrough in word processing
technology since WordStar.*

*Now, state-of-the-art
comes easy.*

Introducing WordStar 2000, a totally new word processing program from the makers of WordStar.

WordStar 2000 removes all limits from word processing. From what you can create. From what you can achieve.

Because WordStar 2000 lets you do everything.

Easily.

**From windows, to undo,
to spelling correction, WordStar 2000
does it all. And more.**

WordStar 2000 gives you the works.

"Windows" allows you to work on different documents—simultaneously. "Undo" lets you replace text you mistakenly removed. A built-in spelling corrector checks and corrects misspellings from over 97% of the most commonly used words.

WordStar 2000 also has a "typewriter mode" to fill in forms or envelopes easily. Plus "format sheets," which give you ready-made

headings, tabs and margins at the touch of one key. It can even create and update footnotes.

**Finally, a truly integrated
word processing system.**

WordStar 2000 goes well beyond words.

It comes with a built-in five function calculator. A built-in mail merge enables you to mass produce form letters. Get our special Plus package and you also get a built-in mail list data base that allows you to create, update and sort your own mailing lists. Also a built-in indexer. Not to mention built-in telecommunications capabilities.

All integrated together, so you never have to leave the program.

**The only word processing program
that interacts with you on your level,
whatever your level.**

Before we created WordStar 2000, we studied the way people worked, and thought. We also drew from our experience with over 1,250,000 WordStar owners.



As a result, the keys you press are the keys you'd expect to press ("c" for copy, "p" for print, etc.). You may also use your computer's function keys. Menus have been uniquely designed for easy access to all functions. And MicroPro's exclusive "tutor-in-your-computer" makes learning fast and fun.

WordStar 2000 is the easy word processing program you'll never outgrow. Of course, the original WordStar and WordStar for PCjr will continue to provide substantial and proven word processing capability for those with more modest budgets.

See your local MicroPro dealer today or call (800) 227-6703 [in CA (800) 632-7979] for the dealer nearest you.

So you can remove all limits from what you can achieve.

WORDSTAR
2000

Current WordStar owners can upgrade to WordStar 2000 quickly and easily through their dealer, or by calling MicroPro Customer Update (800) 227-5609, 9am-3pm P.S.T.

Now there are no limits.™

MicroPro.

At two o'clock in the morning, when most of the country's asleep, and the phone rates have gone down, my computer is talking to our offices all over the country ... all by itself.

With Transporter, my computer can send and receive files — anything from documents to BASIC programs to VisiCalc reports — late at night, after I've gone home for the day, and after long distance rates have gone down. That saves me time and money.

It does all that without anyone here to help it. I just make up a list of things for it to do, and go home. Transporter does all the rest. It "wakes up" at the appropriate time, dials up other CROSSTALK or TRANSPORTER systems, and transfers the files I want. It can even dial up a remote printer, and print files for me. And it does it all with complete accuracy. When I come in the next morning, Transporter gives me a report of what it did, and at what time it did it.

I like it because it frees up my time during the day. The boss likes it because it saves on our phone bill. (The cleaning ladies are still trying to figure it out.)

Transporter — an exciting new idea in microcomputer communications from Microstuf, the creators of CROSSTALK. Ask your local dealer about it.

The Communications Software People

For the IBM personal computer. Requires 96K RAM, two disk drives, PC-DOS, Hayes Microcomputer Products Stack Smartmodem or Smartmodem 1200, IBM Asynchronous communications interface, or equivalent RS232 interface. Communicates with any system running CROSSTALK, TRANSPORTER, or other compatible programs.

Transporter, Crosstalk and Microstuf are Trademarks of Microstuf, Inc. VisiCalc is a Trademark of VisiCorp. Stack Smartmodem and Smartmodem 1200 are Trademarks of Hayes Microcomputer Products, Inc.



Microstuf, Inc.
1845 The Exchange
Suite 140
Atlanta, Georgia 30339
(404) 952-0267



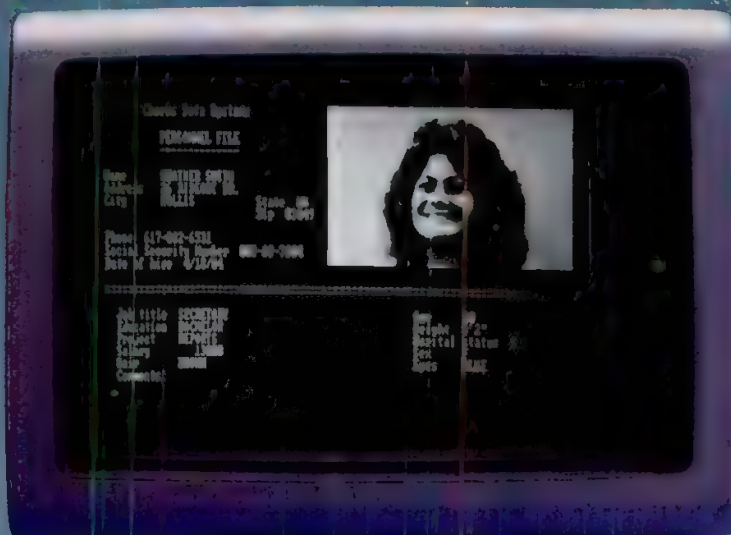
TRANSPORTERTM

CIRCLE 333 ON READER SERVICE CARD

Get the Picture with PHOTOBASE



PHOTOBASE is a software package that works with data base management systems such as: *dBase II**, *R-Base 4000** and the *IBM Filing Assistant**.



PC-EYE is a high speed, high resolution video digitizer board that lets you capture anything you can see.

Now you can open up a whole new dimension in data base applications by merging real-life pictures with popular data base management systems. Pictures of people, products, diagrams, maps, company logos — whatever you want to photograph — can be integrated with your data base. Consider these typical applications:

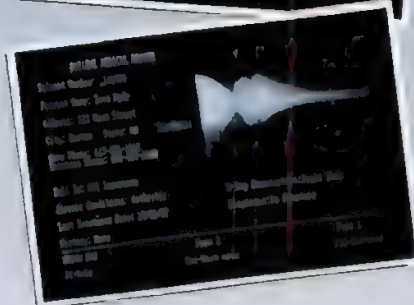
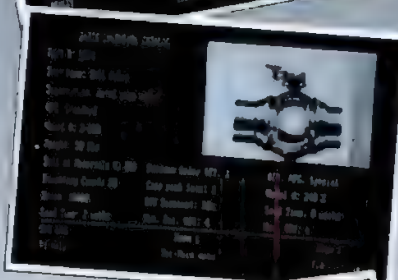
Security — verify those employees who have authorized clearance to limited access areas. A data base containing employee pictures and personnel records can be searched and displayed for visual verification.

Signature Verification — increase the efficiency of credit checks by adding pictures of customer signatures to your financial data base records.

Real Estate — add pictures of houses to on-line real estate listings for faster property identification and improved sales presentations.

Electronic Cataloging — pictures of products can be combined with a data base system containing product specifications, pricing, availability and much more.

Customers, distributors and sales personnel can quickly search data and view the resulting product/picture information on one screen. Files can be updated easily, quickly.



It's Easy

With a simple keystroke, pop-out of your data base system and into the PHOTOBASE menu. Capture images of text, photos, artwork and 3-dimensional objects with an ordinary video camera and our high resolution PC-EYE™ video digitizer. Pop back into your data base system and add the picture name to your data base like you would any other piece of information. The full functionality of the data base system is preserved, but the resulting display is text and picture information on one screen.

Pictures are displayed in the upper right quadrant of the screen at a resolution of 320 x 200 with 16 colors or levels of gray. Text information from data base records fills the rest of the screen. Pictures can also be exploded to full screen.

Call or write and we will send you information on PHOTOBASE, PC-EYE, compatible cameras and other imaging equipment in the Chorus Family of products.

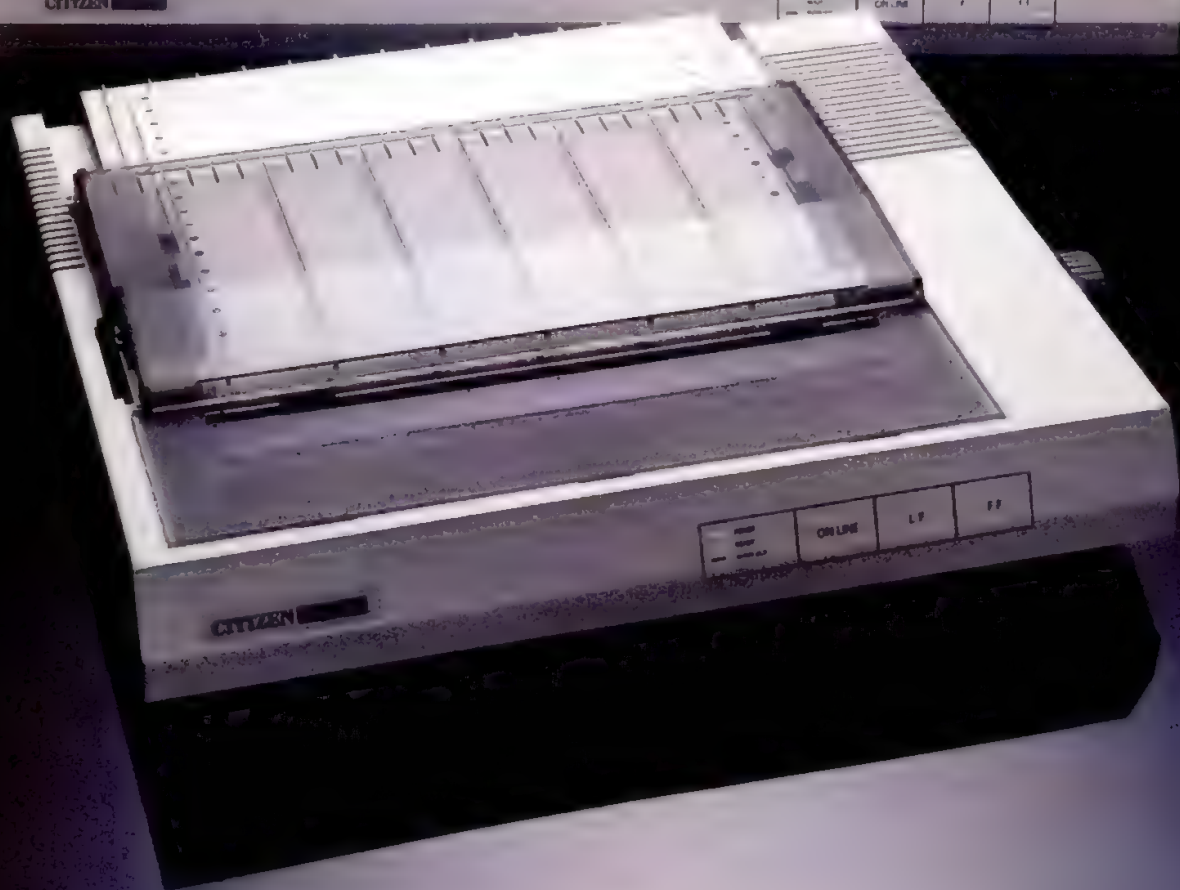
**(603) 424-2900 or
1-800-OCHORUS.**

TM PHOTOBASE and PC-EYE are trademarks of CHORUS Data Systems
*dBase II is a trademark of Ashton-Tate, R-Base 4000 is a trademark of Microm, Inc., IBM Filing Assistant is a trademark of International Business Machines Corporation

CHORUS

CIRCLE 184 ON READER SERVICE CARD

CITIZENS OF THE YEAR.



To become a highly respected Citizen, it takes outstanding performance and faithful public service.



Introducing the two newest Citizen™ dot matrix printers. Engineered with the same care and precision we've built into Citizen watches for over 50 years.

Fast? The MSP-20 and MSP-25 both print an incredible 200 cps, or 50 cps correspondence-quality at the flick of a switch. Quiet? You'll hardly know they're on.

And both feature proportional spacing for hard copy so clean, you'd swear it didn't come from a dot matrix. Plus, all Citizen printers are IBM®- or Epson®-compatible. All feature our easy-to-use push-feed paper loading system. And all come with the industry's longest warranty—18 months on parts and labor. Which can only mean one thing:

Citizens of the year are built to be Citizens of the years.

For more information, call 1-800-556-1234, Ext. 34. In California, 1-800-441-2345, Ext. 34. Or write

Citizen America Corporation, 2425 Colorado Avenue, Santa Monica, CA 90404.



©1984 Citizen America Corporation
Citizen and the Citizen logo are trademarks of Citizen America Corporation. IBM is a registered trademark of International Business Machines Corporation. Epson is a registered trademark of Epson Corporation.

CIRCLE 113 ON READER SERVICE CARD



ANNOUNCING THE LOWEST PRICE IN HISTORY ON A FULLY LOADED QUADBOARD

\$595

384K RAM
INSTALLED
SUGGESTED RETAIL



Now you can pick up Quadram's famous 10 function Quadboard at an incredibly low price. Just \$595 **fully loaded**. Complete with a new extended 5 year warranty and that traditional Quadram Quality. It's the best value around when you want to enhance your IBM PC, PCXT, or PC-compatible.

now a new low price. Contact your dealer today and take advantage of this historic value.

Quadboard by Quadram. At \$595, still the first and only board your IBM PC may ever need.



Quadboard leads the pack with quality, performance, and



IBM, PC and PCXT are registered trademarks of International Business Machines, Inc.

CIRCLE 46 ON READER SERVICE CARD



4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 610-766-4915 (QUADRAM NCRS)

© Copyright 1984 Quadram Corporation
All Rights Reserved

PC News

FROM THE EDITORS OF PC

FEBRUARY 19, 1985

New Disk Developments: Power Promises for PCs

The marriage of computer and laser technologies is celebrated at Washington convention.

BY ARIEL SCHWARTZ

WASHINGTON, D.C.—It is a union as inevitable as Romeo and Juliet, as Hero and Leander, as Laverne and Shirley. Video and computer technologies are inching ever closer to one another, blurring their distinctions like a poor videotape blurs the pictures. The two post-World War II technologies share the science of creating and controlling tiny bits of electricity. And the 1984 Videodisk, Optical Disk, and Compact Disk Conference and Exposition held here presented a sharp picture of the exciting devices possible when the two technologies are linked.

Sponsored by Meckler Publishing, the conference covered the video, audio, and data uses of laser and optical disks. The big news this year was that most new computer-oriented products were compatible with the PC, instead of with Apples, as in years past.

The most remarkable new product was Hitachi's CD-ROM drive, which looks like an industrial-grade version of consumer audio's popular compact disk (CD) players. Like the audio disks, the CD-ROM disk is a 4 1/4-inch shiny silver platter of digitally encoded plastic. But unlike the audio CD disks, the CD-ROM disk is strictly for data encoding, holding up to

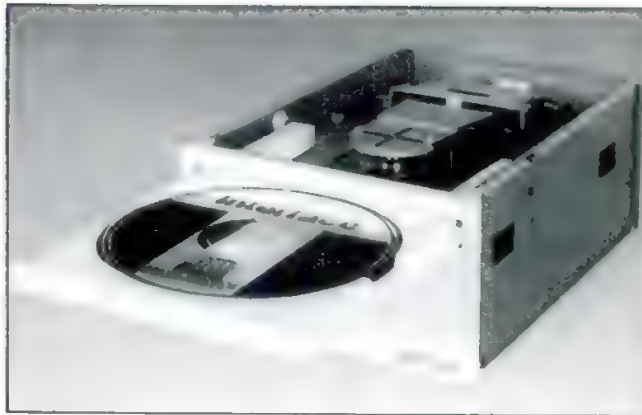
552 megabytes of memory per side—the equivalent of over 1,000 floppy disks or 275,000 pages of text.

That's enough to knock anybody's socks off, but keep in

per disk in quantities of 1,000 or more. That cost could be acceptable for large Fortune 100 companies, but probably a little steep for the smaller businesses. The technology lends itself per-

from track to track and an average total access time of half a second.

The disk player itself will be available as a standalone peripheral or as a subsystem to be installed into a PC just like a floppy or hard disk drive. Hitachi is currently working on the special controller board, called an SCSI (small computer systems interface) connection, and the applications software the CD-ROM will require to work with the PC.



Hitachi's CD-ROM drive reads up to 552 megabytes of data from each side of a removable 4 1/4-inch compact disk. It can fit into an IBM PC's drive slot.

mind that this technology is read only memory, which is why it's referred to as ROM. The disks are mastered like regular compact audio disks and then copies, which are said to be as good in quality as the original, are pressed from the master.

The Master's Voice

Hitachi estimates that the preparation and mastering of the data to disk will cost about \$5,000 per disk and the replication costs will be about \$4 to \$5

per disk in quantities of 1,000 or more. That cost could be acceptable for large Fortune 100 companies, but probably a little steep for the smaller businesses. The technology lends itself per-

fectly to large fixed databases that can be committed to a read-only disk and then produced in quantity.

For example, if Lotus's 1-2-3 were put on a CD-ROM disk along with some enormous database like the entire Dow Jones stock profile for the last 20 years, you would have a resource/applications program combination all on one self-contained disk that can be accessed very fast. The Hitachi unit has a seek time of only 1 millisecond

Private Label

At first, Hitachi plans to offer the CD-ROM drive only to original equipment manufacturers, who will put their own brand names on it and package it in their own computers or standalone units. The CD-ROM player will sell to OEMs for about \$500 and should be available this quarter.

Other CD manufacturers such as Sony, North American Philips, and Denon are also readying their own CD-ROM players which should sell for around \$300 to \$500 to OEMs and for about \$500 retail. Of course, as the market expands, these prices will drop.

ANSI standards for CD-ROM technology are nearing completion. They specify 550

(continued)

Disk Developments (continued) megabytes of memory, although several manufacturers plan to put 600 megabytes on their disks. Unquestionably, the appearance of this new CD-ROM

format, you can mix and match any combination of inputs, and so a typical disk could contain 15 minutes of motion video imagery, 25 hours of compressed digital audio, and still have



Laserdata's PC TRIO system links a PC and a videodisk player with a color monitor. Its disks can contain both computer data and visual images.

technology will enormously enhance the PC and will probably change the nature of personal computing.

Several manufacturers at the Conference talked about read/write optical data disks, but no working prototypes were on display. Perhaps next year's Conference will show read/write optical data disks as a working reality.

Laserdisk Gigs

Other items at the Conference of interest to PC users included Laserdata Corporation's demonstration of a laser videodisk-based data storage system built around the IBM PC. The Cambridge, Mass., company's Laserdata PC TRIO system consists of a PC, a color monitor, a videodisk player, and an add-on board that fits into any expansion slot. The board hooks up to any industry-quality videodisk player with a parallel computer port to enable the PC to control the videodisk player's functions. The output from the player feeds into the board, where it is decoded into video or audio signals, or data.

Each 12-inch laserdisk, also a read-only medium, can hold up to 54,000 video frames, 75 hours of compressed digital audio, or 800 megabytes of data—per side. If a videodisk were to be used purely for data, it could hold 1.6 gigabytes of information. But, with the Laserdata

room for 60 megabytes of data—all on one side of a disk. The compressed audio would not match the quality of compact digital audio disks, but would still be very good. When you compare that with a compact audio disk which holds only 1 hour of music or sound, the trade off in quality seems insignificant.

The Laserdata PC TRIO allows you to use the videodisk player as an additional disk drive for the PC, and to control it with its own software. Laserdata supplies MS-DOS file-access routines and makes several sophisticated information retrieval packages that allow word searches and quick access to structured databases.

Laserdata requires you to submit your data on computer tape for premastering set up so that you can properly access the data on the final disk. The mastering can be done at any regular videodisk mastering facility and copies can be produced in quantity.

Video Network

Laserdata also makes the TRIO 110 unit, which has its own built-in 80186 microprocessor. The unit can control up to four videodisk players and will act as a network file server for up to six PCs, offering a total of 3.2 gigabytes of information on-line.

The PC TRIO board sells for

\$1,365, and the TRIO 110 for \$2,950. You must buy videodisk players separately.

Another interesting group of products shown at the Conference was the Visage V:Link series of boards and IBM PC workalikes tailored for interactive video.

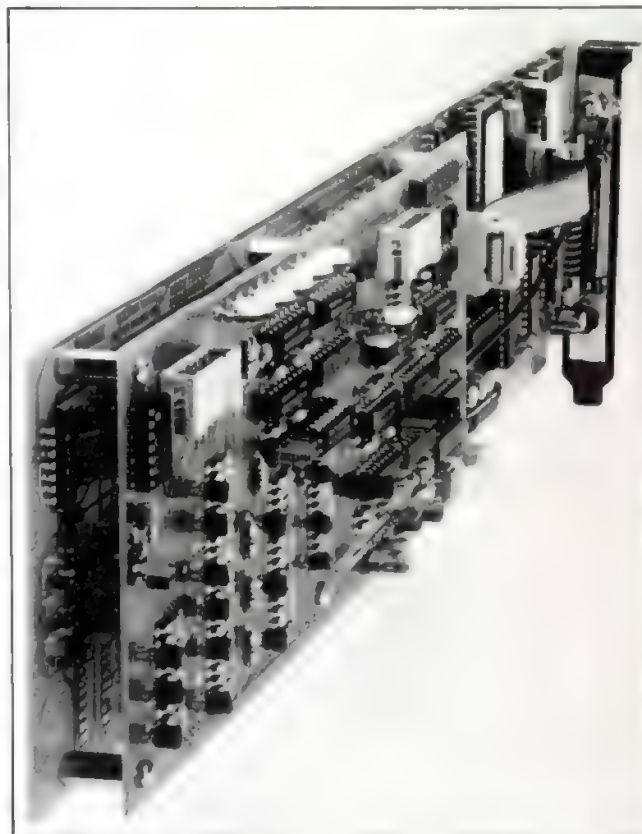
Plenty of Input

The V:Link 1550 board enables you to superimpose PC-created graphics, text, and menus on video imagery supplied by a laserdisk player. The V:Link board then outputs the combined video and graphics image in RGB mode, increasing the clarity of the video image from that of the usually lower-resolution composite-video mode. Control data embedded in the video signal from the videodisk can control the display of graphics and video im-

the videodisk player and to accept a host of other input devices such as touch screens, mice, joy sticks, light-pens, and graphic tablets. Since V:EXEC is a transparent language interface, it will work with programming languages such as BASIC, Pascal, C, assembly language, and even dBASE II. Since it is fully MS-DOS compatible, V:EXEC is expected to work with IBM's new Topview software and Microsoft's Windows.

The strong message from this year's Conference was that IBM PCs and MS-DOS are rapidly becoming the system of choice for all new mass storage and interactive video-audio devices.

As Michael Butler, publisher of the *Interactive Video Technology Newsletter* put it, "We're on the threshold of the second generation of personal computing, when the video-



This V:Link 1550 board, made by Visage Inc., superimposes the text and graphics output of a PC onto a video image supplied by a laserdisk.

agery for a self-contained interactive presentation.

V:EXEC software supplied with the boards is a Virtual Device Interface-based program that enables the PC to control

disk, optical disk, and PC combine to form one system. This powerful new equipment will allow a creative freedom undreamed of a few short years ago." ■

DISCOVERY

AT Speed Thrills On Cheap Crystal

It sounds too good to be true, but a \$5 buy can boost the AT's speed by one-third.

BY BILL HARTS

NEW YORK—It has the ring of a snake oil salesman's pitch: A \$5 part that can boost the performance of a top-of-the-line \$6,000 machine. And, not by just a little, but by 33 percent. Yet that was the report circulating through PC's offices. Hundreds of AT users had juiced up their already high-performance machines by replacing the system board crystal with a \$5, 16-Mhz version available on the shelves of most electronics stores.

The trick is simple. The AT's system clock comes from the factory driven by a 12-Mhz crystal. This yields a 6-Mhz CPU clock. The AT's 80286 processor chip can usually run at speeds of up to 8 or even 9 Mhz. IBM rates its components conservatively, so it put in a crystal that did not run the computer at top speed.

The crystal is mounted in a special socket, so you don't have to solder or unsolder anything. In fact, removal and installation can be done quickly and easily with just a screwdriver, prompting many in the industry to speculate that Big Blue itself intends to upgrade the crystal in later AT versions.

Step by Step

It takes only a few steps to replace the factory-installed crystal with the higher-speed one. First, I disconnected all the external cables from the AT, especially the power cable. But, before removing the top cover, I touched something grounded to make sure that I wasn't carrying a static electricity charge.

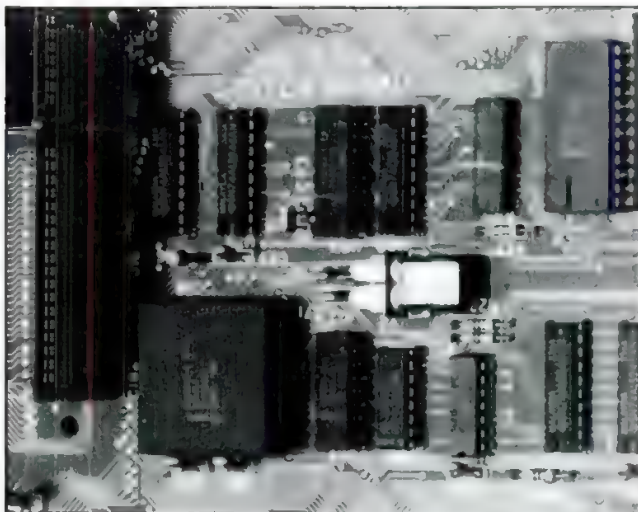
Following the instructions that come with the AT, I removed the cover to gain access

to the system board. The crystal in question is located on the system board immediately behind the 20-megabyte disk drive and is about the size and color of a dime. I carefully worked it free from its socket using a thin, flat-bladed screwdriver, pushing the crystal in the direction of the high-capacity disk drive. This operation should require very little force, and if it seems difficult, you're probably pushing the crystal in the wrong direction.

The replacement crystal should have an HC-18 type case and may or may not have the same leads as the one that is removed. (I used a crystal from a company called NYMPH.) If a crystal has thin wire leads, they should be folded back over themselves to double the thickness and ensure a proper fit in the socket. Polarity of the leads is not important; either wire can go in either side of the socket. Once I removed the original crystal I just inserted the faster crystal, replaced the cover, and then stood back to watch the system fly.

A Word of Warning

I have run a wide range of software on an AT equipped with the new crystal, and experienced no problems so far. In fact, spreadsheets, sorting pro-



The rectangular crystal is mounted at center, above and to the left of the 80286 chip.

grams, and databases all run at an incredibly fast speed. However, I've heard of some people who have experienced balkiness with their AT once they installed a new crystal.

I have not conducted a scientific test and those contemplating replacing the crystal on their own should be very careful. I can't swear there are not some

bottlenecks in the machine that would cause some software or hardware malfunction. Only time and wider use of this technique will tell.

Finally, I can't overstate that replacing the crystal is not an approved practice: Replacing IBM's factory-installed crystal with another automatically voids the warranty.

IBM Admits AT Woes

BY CHARLES BERMANT

BOCA RATON, Fla.—In a move that sent ripples through the retailing world, IBM has announced that, owing to an unexpected consumer demand and a shortage of parts, the elusive IBM PC AT will soon become even harder to find. Many industry experts cite hard disk problems as the real reason for the slowdown, however. In a December statement issued to retailers, IBM said that customers will have to wait at least 9 months to purchase the flagship of the IBM desktop line.

IBM spokesman John Pope

said that the AT has "performed well" and had sustained fewer warranty claims than its PC relatives. This contradicted other reports of a high rate of PC AT hard disk troubles. "I've heard of several dealers who have bought ATs without hard disks and installed something more reliable themselves," said a spokesman for Sysgen, which manufactures hard disks and tape backup equipment.

Pope vehemently denied that there has been a high rate of AT hard disk failures. He said that heavy demand and the unavailability of fixed disk and memory components were entirely to blame for the slowdown, which "will not be long lasting." Pope had no comment as to why only one firm, Computer Memories of Chatsworth, Calif., was manufacturing fixed disks for the AT, or on whether IBM was seeking vendors to take up the slack.

Warning! Warning! Warning!

PC Magazine does not encourage you to change the crystal in your AT. In fact, you will void your warranty if the machine is returned for service with the replacement crystal. Moreover, if you fail to follow proper safety procedures, you could harm yourself or your machine. The replacement crystal has not been thoroughly tested, and PC cannot verify that all software and hardware will run properly with it in place.

—Ed.



Resolution That Blows You Away

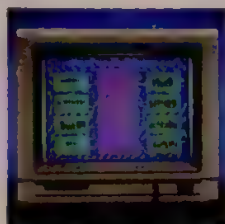
Being #1 has its advantages!
Our Model 440 (720 by 400) Ultra High-Res
monitor is the World's standard for
excellence. Its capabilities will out-rank

those of our competitors for a long time.
We won't Stop producing the finest!
You can't!
Not when you're Number One!



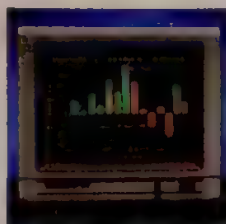
MODEL 440

12 inch Ultra High-Res RGB
Color Monitor
Designed for up-grading
display of IBM PC
720 x 400 line resolution in
non-interlaced mode
4000 character display
capability
Switchable to green
character display



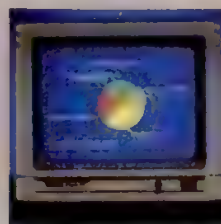
MODEL 425

12 inch Super High-Res RGB
Color Monitor
Fully compatible with IBM
PC and PC Compatibles
640 x 262 line resolution
Switchable to green
character display
Built in audio



MODEL 420L

12 inch Super High-Res RGB
Color Monitor
Long Persistence Phosphor
Tube
Fully compatible with IBM
and most other personal
computers
640 x 262 line resolution in
non-interlaced mode
640 x 525 line resolution in
interlaced mode
Unlimited colors available
through analog video circuit



MODEL 411

12 inch High-Res RGB Color
Monitor
Fully compatible with IBM
PC and PC Compatibles
510 x 262 line resolution
Switchable to green
character display
Built in audio



MODEL 122

12 inch Super High-Res
Amber Display
Fully Compatible with IBM
TTL Monochrome Display
Horizontal scan
Rate 8.432 Khz
Optional Tilt/Swivel Base
available (Model 110-12)
**Green phosphor available
(Model 121)**

TAXAN

The Smart Choice.

18005 Cortney Ct. City of Industry, CA 91748 **(818) 810-1291**

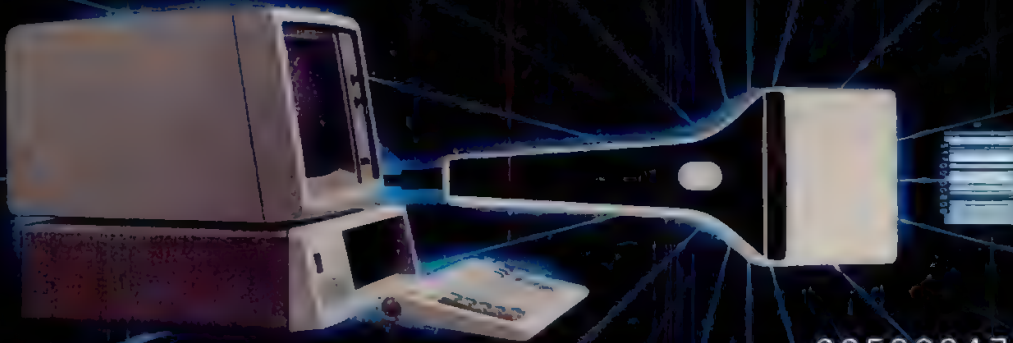
© 1985 TAXAN Corporation

*IBM is a registered trademark of International Business Machines, Inc.

CIRCLE 489 ON READER SERVICE CARD

NORAND
DATA SYSTEMS

**NEW TECHNOLOGY
MARKETING DIVISION**



-20563247918030

0035401351
-604183620750878
-401299938184
-801234565124876
376002568472179
18030

Bar Code Input For Your IBM® PC and XT. Order Direct. Only \$990.

Simplify inventory management with NORAND® 20/20 High Performance Bar Code Reader/IBM® PC interface. Scan bar codes instantly. The system interconnects between the PC keyboard and system unit, retaining full function of the keyboard. The PC-KBD interface adapter converts bar codes to keystrokes. Application programs receive input just as if they were typed at the

keyboard. No special I/O driver software is required.

NORAND 20/20 High Performance Bar Code Reader is the most advanced scanner available. Hand held, it reads any color and surface contour bar code meeting UPC EAN standards. And it reads them instantly without the need for movement or contact required by light pen devices.

The PC-KBD adapter can be switched to scan up to 17 digit UPC and 18 digit EAN bar coded information. Information you can scan includes origin of code — either from 20/20 or keyboard, bar code type designation such as UPC short or EAN long, add-on-5, numeric content of the bar code or check digit, EAN flag digits and add-on code digits.

NORAND 20/20 High Performance Bar Code

Reader IBM PC interface comes complete with PC-KBD adapter, 20/20 Bar Code Reader, power supply, all necessary cables and complete instructions.

Order today. Fill out the handy coupon below. VISA, MasterCard and American Express accepted. Or phone your order — call 1-800-553-5971 Ext. 3556. In Iowa 1-800-332-5938 Ext. 3556.

Ideal for:

- Warehouse Distribution Inventory Control
- Retail Stock Room Inventory Management
- Service Parts Department Inventory
- Jobber Dealer Inventory Management
- Retail Check-out Inventory Control

NORAND
DATA SYSTEMS



Please send me _____ NORAND® 20/20 High Performance Bar Code Reader/IBM PC interface system(s) at \$990.00 each.

My check or money order for _____ system(s) in the amount of \$_____ plus \$10.00 shipping and handling is enclosed.

Please charge to my



Card Number

☐ American Express

☐ VISA

☐ Master Card

Month _____ Year _____

Master Card _____

Signature _____

Name _____

Company _____

Address _____

City _____

State _____

Zip _____

Telephone (Area Code) _____

Allow four to six weeks for delivery.

© 1984 PC LD

Norand Corporation
New Technology
Marketing Division
2851 Mt. Vernon Road S.E.
Cedar Rapids, Iowa 52405

Telephone 1-800-553-5971
Ext. 3556
In Iowa 1-800-332-5938
Ext. 3556

A subsidiary of Power Systems International, Inc.

*Registered trademark of Norand Corporation Cedar Rapids, Iowa U.S.A.
*IBM is a registered trademark of International Business Machines Corporation.

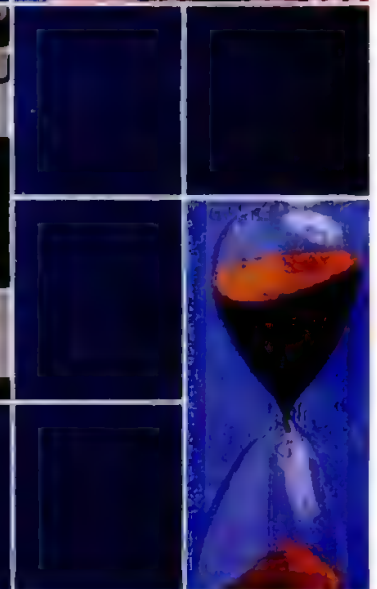
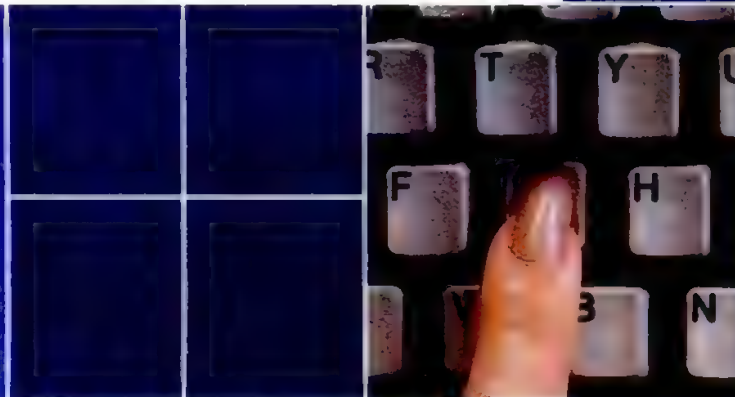
Portable

Backup!



Back Up All the Hard Drives in Your Office.

The MaynStream offers fully portable hard drive backup employing the latest software technology. It is compatible with IBM, Compaq, and NCR personal computers* and comes with an industry-leading 1-year warranty.



MAYNSTREAM



*IBM is a trademark of International Business Machines. Compaq is a trademark of Compaq Computer Corporation. NCR is a trademark of NCR Corporation.

Maynard Electronics

430 E. SEMORAN BLVD., CASSELBERRY, FL 32707
305/331-6402

CIRCLE 437 ON READER SERVICE CARD

News In Brief

Patent Problems...Tandon Corporation, a disk drive manufacturer in Chatsworth, Calif., has filed a complaint of patent infringement with the International Trade Commission (ITC) against three Japanese companies and their United States subsidiaries.

Tandon has charged **Mitsubishi Electric Corporation**, **TEAC Corporation**, and **Sony Corporation** with infringing on the Tandon patent on its disk drives. According to a legal counsel for Tandon, the company has asked for a thorough investigation of the offending companies and requested an immediate general exclusion order to bar infringing products from being brought into the United States.

Simultaneously, Tandon has filed a patent infringement suit against the same three companies in the Los Angeles U.S. District Court and is seeking an undisclosed amount of monetary damages.

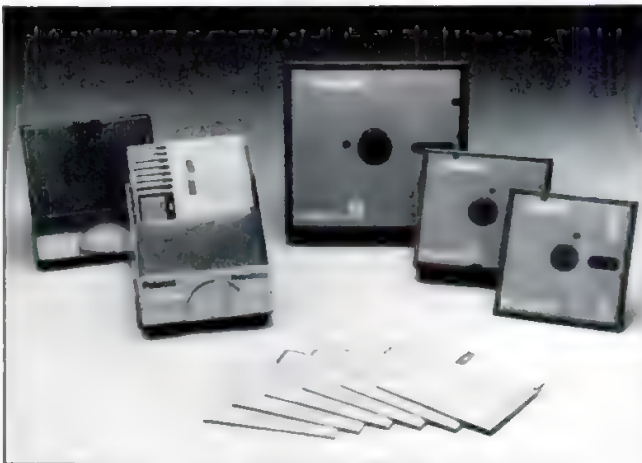
Tandon claims it might have to increase its overseas operations because it fears that infringing Japanese floppy disk drives will take over worldwide sales this year.

Picture Perfect...Now that Eastman Kodak Company has entered the disk manufacturing market, it's no surprise that the **Polaroid Corporation** has too. Polaroid is manufacturing 5¼-inch and 8-inch floppy disks and has plans for a 3½-inch disk as well.

"We know that Polaroid has a good name and reputation," says **Peter B. Cameron**, general business manager of Polaroid's **Computer Data Recording Systems**, "but we knew we had to differentiate our product from all the others."

Cameron says that Polaroid is offering a unique data restoration service that will be provided free to all Polaroid disk users. In addition to providing a 20-year warranty on the physical life of the disk, Polaroid will have a warranty on the data. "With this service, we will take disks that have been damaged or misused, try to save any salvageable data, copy it onto a new disk, and send it back to the customer."

The 5¼-inch disk come in packages of two for \$10 or a box of ten



for \$50. The ten-pack includes a lever that fans the disk upwards so the labels show. If you are looking for a specific disk, you don't have to flip through the box and handle the disks. A ten-pack of 8-inch disks costs \$60.

A DOS of the Coin...Microsoft officials were miffed when reports of **Hand-Held DOS**, a lap-portable operating system, were leaked to *PC Week* in December. Borrowing a leaf from IBM's book,

Microsoft spokesman Marty Taucher says, "It is our policy to not comment about unannounced products." He would neither confirm nor deny any details of the *PC Week* story that stated word processing, spreadsheet, and communication software was being developed in a chip format and would be introduced in conjunction with a lap computer this year.

Taucher would not say if that computer would be from IBM, but he did concede that "one of our OEMs leaked the information to the press. But, any reference to this product is premature."

LAN-ning For The Future...Local area network pioneer **Novell** has called its recent 23-station cooperative COMDEX system a success, with company president **Ray Noorda** saying, "It worked so well that it scared me." Noorda, who heads the Orem, Utah, hardware, software, and consulting firm, said that Novell took a tremendous risk implementing the untested system, used in conjunction with a 3M broadband network. But it was, he adds, "the right time to participate in the broadband industry."

3M and Novell put the network together only weeks before the show. It successfully applied infrared transmission, which, Noorda says, will soon be as economical as stringing a cable across the street.

But, inevitably, there were a few glitches. A labor misunderstanding resulted in an all-night installation session, and Novell found that the machines needed to be turned on one at a time. **AT&T**, the biggest participant, dropped out days before the show because the setup wasn't

"giving their products enough attention," according to Noorda. Furthermore, the trivia game designed to interest participants in the LAN left them with very little understanding of the system's capabilities. "The technology got lost in the trivia game," Noorda says. "Next time we will make it a little more business-oriented."

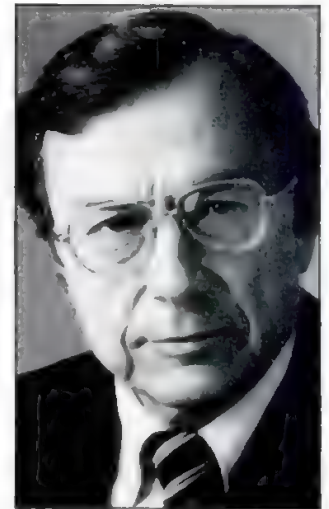
"Next time" won't be the upcoming Atlanta COMDEX, which Noorda says Novell is ignoring in favor of Softcom to "work with the software industry more specifically and help set its standards."

Rules for Dealers...Computer dealers are finding that there's more to their business than ABC. To ease the growing pains of the complex young industry, the **Association of Better Computer Dealers (ABCD)** in Lexington, Ky., an organization that certifies dealers, announced that it has tightened its membership rules.

Under the new rules, only authorized dealers can sell products manufactured by vendors, following authorization contract rules. ABCD dealers may not sell through the mail or over the telephone. They also must accept responsibility for service and support. They must have a service department with adequate spare parts and should also service products bought from other ABCD dealers.

The new rules may seem a bit tough, but Dinsmore is quick to point out the benefits to dealers who can pass muster. "An accredited program, if credible, should add substantial luster to an industry dealership who says, 'I am an ABCD member.'"

—compiled by Jane Mintzer



Ray Noorda

How to save money and time.

Here's How

Here's Why

By shopping by mail with Conroy-LaPointe you can now afford to go the full 640K RAM memory for your PC or get more software with what you save. A phone order only takes about ten minutes, all from the comfort of your home or office.

1. **SAVE** an average of 21% to 46%. (Our average profit over 6 years has been less than 4%.)
2. **FAST QUALITY SERVICE** from our professional and courteous staff and our **LARGE INVENTORY** will save you time and make shopping easy for you.
3. **QUALITY IN-STOCK PRODUCTS** means that we only sell products from reliable and reputable manufacturers. Our return policy guarantees that you won't get somebody else's rejects.

OUR AD
#P14



© 1984 by Conroy-LaPointe, Inc.
All Rights Reserved

PRINTERS

DOT MATRIX:

	LIST	OUR
EPSON, RX80—Color Printer 150 cps	\$1395	In Stock
LQ1500, 200 & 67 cps	\$269	In Stock
RX80—100 cps	\$369	In Stock
RX80—f/1	\$499	In Stock
RX100—100 cps, 136 col./in/8h	\$699	In Stock
FX80—150 cps	\$895	In Stock
FX100—150 cps	\$895	In Stock
MANNESMANN Spirit—80 col, 80cps	\$399	\$299
TALLY, 160—80 col, 160cps	\$799	\$549
180—132 col, 180cps	\$1099	\$779
OKIDATA, EGA—80 col, 120 cps, para	\$349	\$319
83A—132 col, 120 cps, para	\$749	\$599
84—136 col, 200 cps, para	\$1395	\$1095
92—80 col, 160 cps, para	\$499	\$399
93—136 col, 160 cps, para	\$799	\$649
2410P—Pacemaker, 350cps, para	\$2995	\$1995
QUADRAM, Quadjet, Inkjet Color Printer	\$895	\$795
STAR 100C, Gemini 107X, 120cps, 18"	\$499	\$269
Gemini 157X, 120cps, 15"	\$549	\$419
TECHNICA		
1340—144 cps/LQ & 54 cps/DQ NEW	\$995	\$795
1351—100 cps	\$1895	\$1375
TTX, TT(gems, portable/handheld, 40cps	\$229	\$129
LETTER QUALITY:		
JUNKL, 6300—40cps, para	\$995	\$795
JUNKL, 6100—18cps, para, 3 pitch	\$599	\$449
TTX, 1014—13cps, para & Ser, pin/8hct, 3p	\$499	\$365
1114—same as 1014 w/1/f, 2 col/8pco	\$599	\$439

PRINTER INTERFACES & BUFFERS

	LIST	OUR
AIRBO, IBM-PC to Para Printer Cable	\$60	\$30
EPSON, Parallel Interface for LQ1500	\$100	\$79
Serial Interface Board	\$130	\$105
MPIC, Apple II/F & Cable for Epson & Gemini	\$95	\$99
OKIDATA, Plug In Play, Tractor, Diagraphon	\$50	\$42
STAR 100C, Serial Interface & Cable	\$92	\$79

MODEMS

	LIST	OUR
ANCHOR, Signman Mark III	\$399	\$299
HAYES, IBM-PC Smartmodem 1200B	\$599	\$409
IBM-PC Smartcom II Software	\$149	\$99
Microcommod II w/Smartcom	\$329	\$239
Microcommod 100 (S-100 bus)	\$399	\$275
Stack Chronograph (RS-232)	\$249	\$189
Stack Smartmodem 300(RS-232)	\$289	\$225
Smartmodem 1200 (RS-232)	\$699	\$485
IBM-PC to Modem Cable	\$39	\$19
KENSINGTON, Modem 1200	\$595	\$385

MONITORS

AMDEK, Color Series		
Color 300 Comp/Audio	\$349	\$259
Color 500 Comp/VCR/RGB/Audio	\$525	\$395
Color 600 Hi Res, RGB/Audio	\$649	\$495
Color 700 Ultra Hi Res, RGB	\$749	\$595
12" Green, #3000	\$179	\$119
12" Amber, #300A	\$199	\$149
12" Amber, #310A for IBM-PC	\$230	\$159
13" Color IV, RGB, 720Hx400V (IBM)	\$795	\$685
PRINCETON, RGB Hi Res, Hx12	\$795	\$499
RGB Hi Res, SR-12	\$799	\$599
Scan Doubler for SR-12	\$249	\$179
Amber, MAX-12 (for Mono Board)	\$249	\$199
QUADRAM, Quadchrome 12" RGB/Color	\$695	\$495
Quadscreen 17" 960x512 w/cable	\$1995	\$1595
Quadscreen II, 14" RGB Color	\$650	\$450
Amberchrome, 12" Amber	\$250	\$165
ZENITH, 12" Amber, ZVM122	\$150	\$95
12" Green, ZVM123	\$200	\$89
12" Amber, ZVM124	\$200	\$139
12" Color, ZVM135	\$599	\$469

DISKETTES

*** CONROY-LAPOINTE™ DISKETTES**
We guarantee these top quality products with the Conroy-LaPointe name. 5 YEAR LIMITED WARRANTY.

10 ea. DS/DD, 48 Track (IBM, H/P)	\$17
100 ea. DS/DD, 48 Track (IBM, H/P)	\$140
1000 ea. DS/DD, 48 Track (IBM, H/P)	\$1190

CONROY-LAPOINTE™
IBM PRE-FORMATTED DISKETTES
10 ea. DS/DD, 48 Track (IBM-PC Pre-formatted) NEW \$25
100 ea. DS/DD, 48 Track (IBM-PC Pre-formatted) NEW \$210
1000 ea. DS/DD, 48 Track (IBM-PC Pre-formatted) NEW \$1695

CDC, 100 ea. DS/DD, 40T (IBM, H/P)	\$750	\$295
10 ea. DS/DD, 40T (IBM, H/P)	\$75	\$32
DYSAC, 10 ea. DS/DD, 48T (IBM/H/P, etc.)	\$69	\$35
MAXELL, 10 ea. DS/DD, 3 1/4" (MAC)	\$60	\$35
10 ea. DS/DD, HiDensity (IBM-AT)	\$90	\$55
10 each, MD1, SS/DD	\$35	\$19
10 each, MD2, DS/DD	\$75	\$26
VERBATIM, 10 each, MD5/5.01 SS/DD	\$49	\$27
10 each, MD34 DS/DD	\$84	\$32

GENERIC™ DISKETTES
100 ea. DS/DD, 48 Track (IBM, H/P) \$625 \$119
250 ea. DS/DD, 48 Track (IBM, H/P) \$1565 \$319
1000 ea. DS/DD, 48 Track (IBM, H/P) \$6280 \$995

CASH-n-CARRY COMPUTER STORES, INC.
Over 100 Computer Lines only Open Monday Through Friday 10:00 to 7:00
SAN FRANCISCO — NEW STORE! 550 Washington Street
at Montgomery opposite the Pyramid Interstate 80 to Highway
480, take Washington Street East CALL (415) 982-6212
PORTLAND, OREGON — At Pava 217 1/2 and at intersection of
Highways 217 and 39N CALL (503) 620-5595
SEATTLE, WASHINGTON — 2540 12th Ave. SE, Bellevue WA
98005 in Lockman's Plaza near Factoria Square, South East of
Highway 405 & 50 and at South East 38th and Richards CALL (841) 4736

CONROY-LA POINTE

DEALERS
WE BUY
EXCESS
INVENTORIESLOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT
ALL MAIL: Conroy-LaPointe, Inc. 12060 SW Garden Place, Portland, OR 97223 CASH-n-CARRY COMPUTER STORES, INC.—SEE BELOWCOMPUTER
SYSTEMS

— Call for Details —

256K IBM® PC

360K
Disk Drives
by CDC90 Day
Limited Warranty
By UsCOMPAQ Portable,
256K, 2 360K Disk Drives

CALL

SANYO 555-2,
256K, 2 320K Disk Drives

CALL

TeleVideo® PC,
256K, 2 360K Disk Drives, 8088 Chip

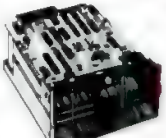
CALL

ZENITH Z150,
256K, 2 320K Disk Drives,
MS DOS 2.1 8088 Chip, 2 S/P

CALL

DRIVES AND
ACCESSORIES
for the IBM-PC or XT

AMCCK

AmDisk V, 1/2 height, internal 320/360K \$ 658 \$ 498
AmDisk III, 3" Dual Floppies, 500K \$ 299 \$ 249CONTROL
DATADISK DRIVES
320K/360K
50/50Call for Larger
Quantity Prices
\$169 FULL HEIGHT
\$149 HALF HEIGHT

30 Day Limited Warranty by Factory Authorized Distributor

CDC, 1/2 Hi Dual Drive Installation Kit \$ 30 \$ 16

MAYNARD, Floppy Cont. (w/Para Port) \$ 300 \$ 239
Interface w/Para Port \$ 300 \$ 185
Interface w/Ser Port \$ 310 \$ 195

PERFECT DATA, Head Cleaning Kit \$ 16 \$ 12

QUADRAM
QuadDisk Internal Hard Disk w/Controller IN STOCK

HARD DISKS

Convert your PC to 10 meg and to be XT compatible with one of the following INTERNAL HARD DISK SYSTEMS. Kits are quality engineered to work with DOS 2.0/2.1 Com. plenty XT compatible. All you need is your DOS manual. Easy to install. Includes 10 Megabyte Hard Disk, Controller Card and Instructions.

K Kammern
Labs
Megahigh 100, 10 mbYTE Hard Disk Kit \$ 799MAYNARD
10 meg Hard Disk Kit, WS1 Sandstar
Controller will accept 3 Sandstar modules \$1395 \$1150TOLL FREE
(800) 547-1289
OREGON ONLY (800) 451-5151HOT LINE
Monday-Friday 9-5 PM PST
Saturday 10-4 PM PST
Sundays 10-4 PM PSTORDER DESK HOURS
Monday-Friday 9-5 PM PST
Saturday 10-4 PM PST
Sundays 10-4 PM PSTCREDIT CARD
APPLICATION FORM
Please send me a Conroy-LaPointe credit card application form 1 under stand there is no 3% charge on Conroy-LaPointe credit card purchases. Minimum initial purchase \$400. NAME ADDRESS CITY STATE ZIP MAIL: PO: 12060 SW Garden Place, Portland, OR 97223

FOR YOUR IBM-PC or XT

AST

ADVANTAGE Multi-Bid for AT
SuperPlus, 64K, S/PCC+S/W \$ 395 \$ 245
SuperPlus, 64K, S/PCC+S/W \$ 395 \$ 245
SuperPlus, 64K, S/PCC+S/W \$ 395 \$ 245
Game Port for SuperPlus \$ 19 \$ 19
1/0 Plus II, S/PCC/G \$ 215 \$ 150
1/0 Plus II, S/PCC/G \$ 215 \$ 150
1/0 Plus II, S/PCC/G \$ 215 \$ 150
1/0 Plus II, S/PCC/G \$ 215 \$ 150
MonoGraphPlus™ PC (for Lotus) \$ 495 \$ 375
PCNet Starter Kit PC002 \$ 1490 \$ 795
PCNet Circuit Board, PC001 \$ 695 \$ 365
ComboPlus Products
MegaPlus Products

CURTIS

UNI-Monitor bit & sweet base \$ 50 \$ 39
3 to 9 Keyboard Extension Cable \$ 40 \$ 30
Vertical CPU "System Stand" \$ 25 \$ 19
Monochrome Ext. Cable Pair \$ 50 \$ 35

HAUPPAGE (HCW)

8087 Chip \$ 175 \$ 139
8087 Math Pak \$ 295 \$ 235
8087 Software Pak \$ 180 \$ 138
8087 Macro Pak \$ 245 \$ 195

HERCULES

Color Card w/Para. Graphics Card, Mono \$ 245 \$ 169
Color Card w/Para. Graphics Card, Mono \$ 245 \$ 169

KAMERMAN

External Power Supply \$ 395 \$ 295

KENSINGTON

Masterpiece \$ 140 \$ 95
PC Saver™ Line Card w/Filter \$ 50 \$ 39

KeyTronic

K85150 Std. keyboard \$ 199 \$ 159
K85151 Std. keyboard \$ 205 \$ 165
K85151 Y keyboard \$ 259 \$ 199

Koala

Koala Pad™ w/PC Design \$ 150 \$ 89
Programmer's Guide \$ 15 \$ 14

MAYNARD

MultiFunction (6) Card, MFC \$ 89 \$ 79
Memory Card no RAM \$ 199 \$ 169
Memory Card 256K \$ 495 \$ 395
HardDisk I/F Module (HDM) \$ 499 \$ 399
HardDisk Cable \$ 30 \$ 27
Para Port Module (PPM) \$ 59 \$ 49
Serial Port Module (SPM) \$ 95 \$ 79
Clock Cal. Module (CCM) \$ 55 \$ 48
Game Adapter Module (GAM) \$ 49 \$ 43
Memory Module "D" K (MMO) \$ 122 \$ 99
Memory Module 256K (MM256) \$ 422 \$ 357
XT10 meg Hard Disk & I/F WS1 \$ 1395 \$ 1150

STAR SERIES

Paral Port Module (PPM) \$ 59 \$ 49
Serial Port Module (SPM) \$ 95 \$ 79
Clock Cal. Module (CCM) \$ 55 \$ 48
Game Adapter Module (GAM) \$ 49 \$ 43
Memory Module "D" K (MMO) \$ 122 \$ 99
Memory Module 256K (MM256) \$ 422 \$ 357
XT10 meg Hard Disk & I/F WS1 \$ 1395 \$ 1150

TITAN

Titan Accelerator PC (8086+ 128K) \$ 995 \$ 750

SOFTWARE for IBM-PC or XT

BUSINESS & TRAINING

APPLIED SOFT., Versaform \$ 389 \$ 249
ARKITRONICS, Jane \$ 295 \$ 189
ASHTON-TATE, Framework \$ 695 \$ 349
dBase III \$ 695 \$ 369
dBase II (freq. PC-DOS & 128K) \$ 495 \$ 289
dBase II to III upgrade \$ 200 \$ 119
Everyman's DB Primer (Book) \$ 15 \$ 12
Friday! \$ 295 \$ 159
ATI, Training Programs—Large Inventory \$ 75 \$ 50
BPI, Job Cost Accounting \$ 795 \$ 495
Gen'l Acctg, AR, AP or PR, each \$ 595 \$ 375
Personal Accounting \$ 195 \$ 125
BRODERBUND, Bank Street Writer \$ 80 \$ 50
CDEX, Training Programs—Large Inventory \$ 70 \$ 45
CONTINENTAL, Ultrafile \$ 195 \$ 125
Tax Advantage \$ 70 \$ 45
Home Accountant Plus \$ 150 \$ 90
FDM (Filing, Cataloging, Mailing) \$ 125 \$ 79
Property Management \$ 495 \$ 329
DILITHIUM PRESS, PC to MAC & Back \$ 100 \$ 65
DOW JONES, Investment Evaluator \$ 139 \$ 99
Market Manager \$ 300 \$ 189
Market Analyzer \$ 350 \$ 219
Market Manager \$ 350 \$ 219
FOX & GELLER, dBASE/MS-DOS or CP/M80 \$ 98 \$ 65
Quickcode or dGraph, each \$ 295 \$ 185
HARVARD, Total Project Manager \$ 495 \$ 315
Harvard Project Manager \$ 355 \$ 250
HAYDEN, The Writer \$ 200 \$ 125
The Speller or Sargon III, each \$ 50 \$ 30
HOWARD SOFT., Tax Preparer \$ 250 \$ 200
Real Estate Analyzer \$ 250 \$ 170
HUMAN EDGE, Communications Edge \$ 195 \$ 119
Mind Probe \$ 50 \$ 32
Management/Sales or Negotiation Edge, ea. \$ 250 \$ 150
RUS, EasyWriter II System \$ 350 \$ 250
EasySpeller II \$ 85 \$ 125
GL, AR, AP, OE or INV, each \$ 595 \$ 375
Business System, GL+AR+AP \$ 1495 \$ 995
INSOFT, GrafORTH (animated 3D graphics) \$ 125 \$ 65
KENSINGTON, Easy Link Mail Manager \$ 95 \$ 65
KNOWARE, Knoware (reg. graphics) \$ 95 \$ 64
LIFETREE, Volkswriter Deluxe \$ 395 \$ 159
Volkswriter \$ 195 \$ 105
LIVING VIDEOTEXT, Think Tank \$ 195 \$ 105
LOTUS, 1-2-3 \$ 495 \$ 309
Symphony \$ 695 \$ 465
MDBS, KnowledgeMan \$ 500 \$ 300
MECA, Managing Your Money \$ 195 \$ 125
MICROPRO, WordStar \$ 350 \$ 189
WordStar 2000 \$ 495 \$ 295
WordStar 2000 Plus \$ 595 \$ 325
WordStar Professional Plus \$ 695 \$ 395
WordStar Professional, 4 Pak \$ 495 \$ 265

BUSINESS & TRAINING

MICROPRO, CorrectStar \$ 145 \$ 77
InfoStar Plus (+Starburst) \$ 595 \$ 315
MailMerge, SpellStar or StarIndices, ea. \$ 99 \$ 54
ProMotion Pak (MM/SS/IS) \$ 195 \$ 105
MICROFORM, ReBase Series 4000 \$ 495 \$ 295
Extended Report Writer \$ 150 \$ 95
ReBase Out \$ 195 \$ 125
MICROSOFT, Spell \$ 195 \$ 125
Multiplan \$ 50 \$ 32
Chart or Project, each \$ 250 \$ 159
Word \$ 375 \$ 235
Word with Mouse \$ 475 \$ 289
MONOGRAM, Dollars & Sense w/Forecast \$ 180 \$ 105
MULTIMATE, Multimate \$ 495 \$ 295
OPEN SYS, GLARAP PR/INV or PO, each \$ 695 \$ 425
OSBORNE/COMIX, Book & Busin. Stat. & Math Programs on DS/DD Disks \$ 100 \$ 69
Some Common Basic Programs (70 ea.) \$ 100 \$ 69
Practical Basic Programs \$ 100 \$ 69
PEACHTREE, Peach Pak \$ 395 \$ 239
Peach Tree 5000 \$ 395 \$ 239
PERFECT/THORN, Perfect Writer \$ 349 \$ 179
Perfect Writer & Speller Combo \$ 399 \$ 199
PROFESSIONAL, Trivia Fever \$ 40 \$ 25
QUADRAM, Tax Strategy \$ 395 \$ 295
Investment Strategy \$ 395 \$ 295
QUE, Using 1-2-3 or 1-2-3 for Business (Books) \$ 15 \$ 12
MOESOFT, Prokey \$ 130 \$ 87
SOFTWARE ARTS, \$ 399 \$ 209
TK Solver (MS DOS or PC DOS, spec.) \$ 495 \$ 295
SOFTWARE OWN, Accounting Plus \$ 495 \$ 295
SOFTWARE INTL, Open Access \$ 695 \$ 395
SOFTWARE PUBLISHING, PFS Report \$ 125 \$ 79
PFS File PFS Write, PFS Graph, PFS Plan \$ 140 \$ 89
PFS Print \$ 95 \$ 59
SORCINL, SuperCalc III \$ 395 \$ 245
SRI/SATELLITE, WordPerfect \$ 495 \$ 295
Personal WordPerfect \$ 195 \$ 99
STONEWARE, Advanced DB Master \$ 595 \$ 395
SUMMA, Trader's Forecast \$ 200 \$ 129
Trader's Data Manager \$ 200 \$ 129
Trader's Accountant \$ 219 \$ 139
Complete System \$ 700 \$ 445
VISICORP, VisiCalc 4 \$ 250 \$ 159

UTILITY & SYSTEM

BORLAND, Sidekick \$ 55 \$ 35
Sidekick (Copiable) \$ 85 \$ 55
Turbo Pascal or Toolbox, ea. \$ 55 \$ 35
CENTRAL POINT, Copy II PC \$ 40 \$ 30
COMIX, FastRAM™ RAM Disk emulator and printer spooler program. Works on any PC DOS version or RAMCard Menu Driven \$ 100 \$ 59
DIGITAL REEL, CP/M-86™/PC-XT/AT Concurrent CP/M-86™ w/windows \$ 80 \$ 39
\$ 835 \$ 225

UTILITY & SYSTEM

DIGITAL REEL, CBASIC 86™ (CP/M86) \$ 200 \$ 135
CBASIC Compiler (CP/M-86 or PC DOS) \$ 600 \$ 395
PL/1 (CP/M-86) \$ 750 \$ 479
PL/1 (PC/AT) \$ 750 \$ 479
Speed Prog. Pkg. (CP/M-86) \$ 200 \$ 135
DR LOGO-86 (CP/M86) \$ 100 \$ 69
FUNKY SOFTWARE, Sideways \$ 60 \$ 40
HAYES, Smartcom II (Data Com.) \$ 149 \$ 99
INSOFT, GrafORTH (animated 3D graphics) \$ 125 \$ 65
LIFEBOAT, Lifeline C \$ 500 \$ 295
MICROSTUFF, Crosstalk XM (Data Com.) \$ 195 \$ 139
MICROSTUFF, multiMath/muSimp \$ 300 \$ 199
Business BASIC Compiler \$ 600 \$ 399
Pascal Compiler \$ 300 \$ 199
C Compiler \$ 300 \$ 199
BASIC Compiler \$ 395 \$ 259
FORTRAN Compiler \$ 350 \$ 229
CIBOL, Compiler \$ 700 \$ 459
MOUSE SYSTEMS, PC Paint \$ 99 \$ 69
NORTON, Utilities 2.0 14 programs \$ 80 \$ 54
OPEN SYS, BASIC Interpreter \$ 195 \$ 145
ROSESOFT, Prokey \$ 130 \$ 87

HOME & EDUCATIONAL

ARMONK, Executive Suite \$ 40 \$ 27
BLUE CHIP, Millionaire or Tycoon, each \$ 60 \$ 39
BPI SYSTEMS, Personal Accounting \$ 99 \$ 63
CBS, Large Inventory in Stock \$ 100 \$ 69
COMPREHENSIVE, PC Tutor (I or 2 Q, ea.) \$ 60 \$ 40
CONTINENTAL, Home Accountant Plus \$ 150 \$ 89
DAVIDSON, The Speed Reader II \$ 75 \$ 45
Word Attack or MathMaster, each \$ 50 \$ 32
DOW JONES, Home Budget \$ 139 \$ 89
HARCOURT, Computer SAT \$ 80 \$ 49
MICROSOFT, Flight Simulator II \$ 50 \$ 33
MONOGRAM, Dollars & Sense \$ 165 \$ 110
PBL CORP., Personal Investor \$ 145 \$ 99
SCARBOROUGH, Master Type \$ 50 \$ 32
SIMON & SCHUSTER, Typing Tutor III \$ 50 \$ 33

GAMES

ATARI, Centipede, Pac-Man or Donkey each \$ 35 \$ 29
BRODERBUND, Large Inventory in Stock \$ 100 \$ 69
ELECTRONIC ARTS, Full Line in Stock \$ 100 \$ 69
EPYX, Auto Sam or Temple of Apshai \$ 40 \$ 27
HAYDEN, Sargon III (Chess) \$ 50 \$ 34
INFOCOM, Deadline or Suspended, ea. \$ 50 \$ 33
Zork I or Zork II or Zork III, each \$ 40 \$ 27
INSOFT, Mystre, Wordtris or Quattro, ea. \$ 35 \$ 25
MICROSOFT, Flight Simulator II \$ 50 \$ 33
ORIGIN, Ultima III \$ 60 \$ 39
PROFESSIONAL, Trivia Fever \$ 40 \$ 25
SPINNAKER, Large Inventory in Stock \$ 100 \$ 69
SUB LOGIC, Night Mission Pinball \$ 40 \$ 27

★ MEANS A BEST BUY

CHIP & MEMORY SPECIALS

Memory Chip Kit \$35

9 Each, 4164, 200 ns

90 Day Warranty by us

Call for Larger Quantity Prices

© 1983 Conroy-LaPointe, Inc.

ComX

EconORAM™ 384K BOARD \$350

With FastRAM™ RAM Disk Emulator and Spooler Software

Fully Compatible, 1 Year Limited Warranty by ComX

Works on DOS 1.1, 2.0 or 2.1

Prices and availability subject to change. Call

PRODUCT REVIEW

Mind Altering Software: Do You Want to Trance?

Relax—and let the PC be your guide to self-hypnosis and subliminal suggestion.

BY COREY SANDLER

Subliminal Suggestion and Self-Hypnosis Programs for Your Computer

Greentree Publishers
5364 Ashwood
Camarillo, CA 93010
(805) 483-5375

List Price: \$68.95 plus \$5 shipping

Requires: 64K RAM.
monochrome or color/graphics
adapter.

Your eyes are getting heavy. Your limbs feel like lead. You're getting sleepy. And you find yourself dreaming of that special hidden beach on the south shore of Nantucket. Suddenly, work seems a million miles away. And it's all thanks to your PC.

No, I'm not talking about falling asleep in front of your monochrome monitor as you wrestle with the forty-seventh version of your never-ending search for the perfect financial model for tube top futures. I am talking about a new piece of software with the awkward title of *Subliminal Suggestion and Self-Hypnosis Programs for Your Computer*. Luckily, despite the name, it turns out that the software is for computer users, rather than for the hardware itself.

Three Modules

Subliminal Suggestion and Hypnosis Programs consists of three modules: Self-Hypnosis, Subliminal Suggestion, and Relaxation Exercise.

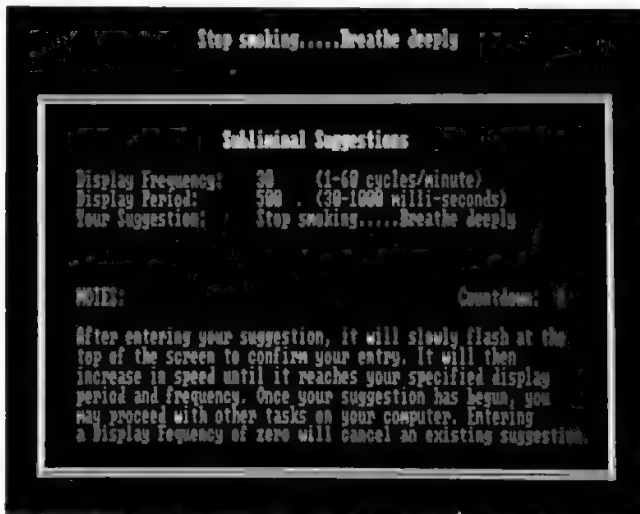
One problem faced by this program—but perhaps it's actually a selling point—is the general misconception about what hypnosis and subliminal suggestion really are. Modern psychologists generally do not consider hypnosis to be the trance-

like "sleep" of Hollywood fame. Hypnosis could more accurately be described as a state of deep mental relaxation and concentration, in which the subject is fully aware of surroundings. The key is to remove—as

moving through a tunnel. According to the authors, the boxes begin moving at a rate just below the "alpha" brain wave level, and then slow down to the "theta" level, which is said to be the most conducive to a hypnotic state.

Alpha Bits

After induction, the suggestion you've chosen will begin flashing on the screen, and, according to the theory, enter directly into your subconscious mind. The authors promise that the program will beep to bring you out of your hypnosis. If it doesn't, a ringing telephone (what, you unplugged it?), an alarm clock, your landlord, or



Why struggle with smoking urges? Let your PC share the burden of keeping you honest.

far as possible—sensory input from the here and now and replace it with thoughts and senses that are deemed more valuable.

The Self-Hypnosis module is described in the manual as an "automated" session. The authors suggest dimming the lights and unplugging the telephone to assure concentration. Answering questions posed on screen, you choose the length of the "induction count," the suggestion period, and the message. The induction count is the computer equivalent of the swinging gold watch: on the screen, the program presents a cascading series of rectangles, drawing the eyes inward from the screen to a numeric countdown.

The effect is something like

something is sure to wake you. I tried the hypnosis program late one night and found the exercise a bit tiring. My mind drifted, my head bobbed, and I felt myself quite alert before the beep sounded on my computer. I shut off the computer, went to bed, and slept right through three middle-of-the-night feedings for the baby. My wife didn't think it was all that funny when I congratulated her in the morning on not having to get up for a milk run all night.

It turned out to be more relaxing than the Relaxation Exercise module, which merely presents pulsating images on the screen.

The advantages of using a computer to send subliminal messages is the machine's tireless ability to repeat a message: it can display up to 30,000 re-

petitions in an 8-hour day. The barely perceptible message is said to slip in around the edges while your conscious mind devotes itself to that financial model.

In this program, you create a one- or two-line message and choose a frequency and a display duration. The minimum is 30 milliseconds, which makes the message just barely visible if you stare hard. (The high-persistence green phosphor used on some monitors makes for a ghostly afterglow.) The program is supposed to remain as an overlay to DOS once you boot up for the day, flashing away until you clear RAM with a reset or by shutting off the power. I found, though, that the message display couldn't fight its way through certain programs, among them a compiled BASIC telecommunications package. The message kept flashing when I went into *WordStar*, but the phrase was in the same location as the word processor's status line at the top of the screen, perhaps obscuring the message.

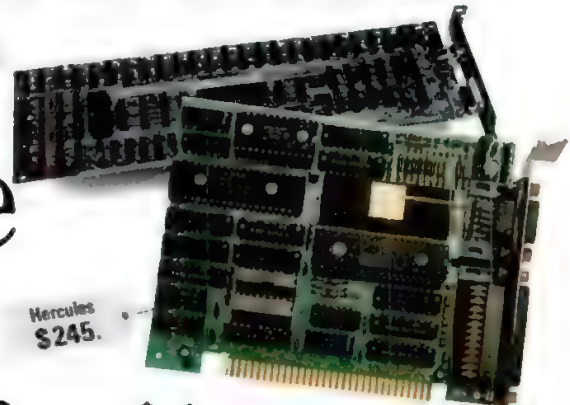
Screen Stares

Will the program work to convince your boss to give you a raise, or your cute colleague to give a date? Leaving aside the serious legal and moral issues this raises, you'll have to deal with a few practical matters.

First of all, you'll have to convince him or her to sit and stare at the screen. And then, the suggestion has to be one that reminds rather than convinces. And, if your victim figures out what you're up to, the consequences might not be worth the possible reward. You might do better with flowers, candy, a new outfit, or a Caribbean vacation.

Authors Michael Anderson and Lonny McKinnon offer a few titillating comments in their instruction manual, wondering whether some American businesses have not already incorporated subliminal suggestion into their plans of operation. Gee, I wonder if they introduced a hidden suggestion into the disk they sent me. Buy this program. Buy this program. Buy this prog . . .

The new HERCULES Color Card gives you the parallel port IBM forgot-for \$1 more.



The new Hercules Color Card gives you these five important features in a color graphics card.

1. Full IBM color card compatibility.¹ Any program that runs on IBM's color card will run on the new Hercules Color Card at the same resolution.

2. A parallel printer port—standard on the Hercules Color Card, but forgotten by IBM on theirs.

3. It's short. The pint-sized Hercules Color Card fits in the short slot in an XT or *Portable*.² And it's AT™ compatible.

4. It can work in your system at the same time as the famous high resolution Hercules Graphics Card.³ And it will continue to work backed by our 2 year warranty.

5. Low price. At a suggested list price of \$245, the Hercules Color Card is only \$1 more than IBM's card.⁴ And our Graphics Pak™ saves you even more money when you buy both Hercules cards at the same time.

Call 800 255-5550 Ext 420 for the name of the Hercules dealer nearest you. See why the company that made the first graphics cards for the IBM PC still makes the best.

	IBM Mono Display Compatible	IBM Color Display Compatible	Hi-Res Text	720 × 348 Hi-Res Graphics	320 × 200 Color Graphics	640 × 200 B & W Graphics	Parallel Printer Port
Hercules Color Card		•			•	•	•
Hercules Graphics Card	•		•	•			•
IBM Mono Card	•		•				•
IBM Color Card		•			•	•	

Hercules.
We're strong
on graphics.

CIRCLE 146 ON READER SERVICE CARD

Address: Hercules, 2550 Ninth St. Berkeley, CA 94710 Ph. 415 540-9000 Telex 754063 Foreign distributors: Compuserve/Canada; Reflex/ U.K. Computer 2000 W. Germany; Edisoft France; Imageering Austria; Holland Info Products/Holland; DataTeam/Scandinavia
Trademarks Owners: Hercules, Graphics Pak, Hercules Computer Technology, IBM, AT International Business Machines **Notes:** (1) An adapter is supplied for composite video. (2) The IBM Color/Graphics Monitor Adapter must be removed from the *Portable* before the Hercules Color Card is installed. (3) Model GB101 or later. (4) Based on the list price as of 7.1.84 for the IBM Color/Graphics Monitor Adapter.

WordPerfect 4.0. Our

The process of perfecting word processing.

At SSI, we're not in the habit of resting on our laurels. Even though the overwhelmingly positive response to WordPerfect has tempted us to do just that, we just don't. Instead, we spend our time making WordPerfect even more perfect.

WordPerfect 4.0, our newest edition, is the result of all that work. With the input of users and dealers, we have added several important enhancements and features to WordPerfect, making 4.0 the most perfect WordPerfect, yet.

included in WordPerfect's base price... is a 30,000-word speller to which you can add...

InfoWorld Magazine

Expanded and improved.

You may not have been satisfied with WordPerfect's 30,000-word dictionary. And neither were we. So, WordPerfect 4.0 includes a new phonetic dictionary with 85,000 words (which take up less space on the disk than did 30,000 pre-



viously). Plus, the new dictionary includes a document word-count feature and the ability to search entries using any letter in the word.

this fall we can expect new WordPerfect features such as table of contents and index generation

PC Magazine

Right on time.

WordPerfect 4.0 features automatic generation of indexes and five types of tables, including table of contents. You simply mark words to appear in the desired tables, and generation is accomplished with just one keystroke.



Footnoting is a good example of WordPerfect's sensible style.

Business Computing

Sensible, but not good enough.

The same footnoting capabilities garnering much praise for WordPerfect are even more enhanced in WordPerfect 4.0. Now lengthy footnotes can span multiple pages, and footnotes can be placed either at the bottoms of pages or at the end of the document. In fact, footnotes and endnotes can both be used in a single document.

Earlier versions of WordPerfect were plagued with poorly organized documentation.

Softalk Magazine

We agree.

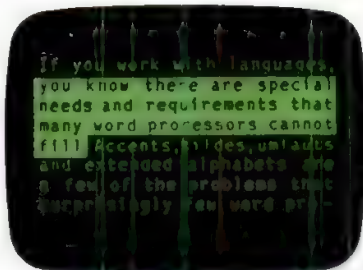
The documentation for WordPerfect 4.0 reflects a great deal of reorganization and improvement. Following a number of suggestions

highest marks yet.

from users and after extensive testing of the new format, SSI is excited to introduce this significantly enhanced documentation package. Many new diagrams have been added and tutorials are more extensive. In addition, the reference section is expanded and better organized for ease of use.

The program does not adequately mark text slated for deletion or movement. The block ought to be highlighted.

InfoWorld Magazine



Makes sense.

A new block highlight feature of WordPerfect 4.0 lets you know exactly what block of text you have defined.

The program would be enhanced if it regularly saved text to disc.

InfoWorld Magazine

Done.

WordPerfect 4.0 allows you to set desired intervals for automatically saving text.

And there's more.

Other WordPerfect 4.0 enhancements include a new template with commands consolidated in the function keypad; enhanced printer management; a network version of 4.0 supporting selected networks; an auto-date insert feature; a cursor definition capability; automatic paragraph numbering; automatic outlining; and redline and overstrike printing.

High goals, high marks.

At SSI, we never stop working on newer, better enhancements for WordPerfect, reaching for perfection. And we never will. That's why WordPerfect 4.0 lives up to its name and its high marks.

Introduce yourself to WordPerfect 4.0. It's the closest thing to perfection.

For more information, see your dealer. Or call or write:



SSI Software

Reaching for perfection.

288 West Center Street Orem, Utah 84057

Information: (801) 224-4000 Order Desk: 1-800-321-4566, Toll-free

EVERYTHING ABOUT YOU IS UNIQUE.



You need nothing
less than a
custom news service

From your fingerprint to your monogram, you are unique. You wear a business suit tailored just for you; now you can get business news tailored just for you. With NewsNet you get vital, in-depth business news. You get expert information on your industry or profession. Through your computer and telephone, you get news on a vast range of subjects from the world's largest retrieval service of business newsletter information.

3,000 New Articles Screened Each Day

You'll get access to more than 250 business newsletters, plus wire services like UPI and PR Newswire. There's news on everything from computers to investments, from taxes to telecommunications. 3000 new articles are added every day and each one is screened specially for you.

Fast, Versatile, Simple

You enter key words, names or phrases. NewsNet stores them and saves every article containing those words. Check in daily, even hourly; scan the headlines or read entire articles, and print out what you want to keep. Change key words when you like. You're free from the worry that you've missed something important—and your topics may turn up in publications you'd never have time to read. If you're onto a new topic, the entire NewsNet database is available for your search. Get special reports on your competition, the inside story on an industry, or press coverage of a company's new product.

Start Saving Now

The average newsletter carried by NewsNet costs \$200 per year in print form. That's \$50,000 worth of newsletters. Yet with NewsNet you pay as little as \$15 per month for access. And NewsNet has no initiation fee. It's a tremendous value. So call today. We'll send everything you need to start saving now.



800-345-1301

(In PA 215-527-8030)

945 Haverford Rd. Bryn Mawr, PA 19010

CIRCLE 370 ON READER SERVICE CARD

It's only logical to do it yourself and save on

Hard disk & tape back-up

Statewide has your PC compatible internal storage solution



10 & 20 Megabyte, Low Power, Half Height Hard Disk Kit.

These systems are designed with the IBM PC USER IN MIND. Just plug it in and it's ready to run. Boots DOS 2.0 directly from disk. Low power drives with advanced controllers gives you the power of an XT. Everything you need to make your up-grade simple and easy.

Hard Disks by Cogito

10 MB
699 List 895
20 MB
995 List 1295

10 Megabyte, Half Height, Floppy Tape Drive Kit.

You can now feel at ease with your hard disk files stored away on a tape cartridge. Our 10 MB floppy tape kit operates as easy as your floppy disk, and gives you 30 disks worth of storage on a .125" tape cartridge. Unit runs off floppy controller board in your system. Simple and easy, the Statewide way.

Floppy Tape Drive by Irwin Magnetics

10 MB
595 List 795

Choose additional kits and systems for your computing needs.

- Full Height Hard Disk Drive Kits

10 MB85 MS28 watt	679	List 895
20 MB85 MS28 watt	945	List 1295
67 MB30 MS28 watt	2395	List 3295
- External Hard Disk Drives for IBM & Apple

10 MB Complete system	995	List 1295
30 MB complete system	1695	List 2495
- External 45/60 MB Tape Back-up

	1195	List 1395
--	------	-----------
- Half Height 360K DS Floppy Drive

	159	List 195
--	-----	----------
- IBM PC, Dual Half Height Floppies, 256K Monochrome Monitor

10 MB Hard Disk	2995	List 3995
20 MB Hard Disk	3395	List 4195
- IBM PC at Complete System with 45/60 MB

Tape Drive and 24 MB Hard Disk	Call
43 MB Hard Disk	Call
67 MB Hard Disk	Call



45/60 MB Internal Streaming Tape Back-up System Kit.

This 9 track tape drive stores formatted data on standard 3 MXL tape cartridge. Software allows you to access files, copy protect files, and back-up/restore hard disk very quickly. A very cost effective solution to high capacity storage.

45/60 MB
895 List 1195



10 MB Removable Cartridge Winchester Hard Disk Kit.

The intelligent alternative to hard disks without back-up. Winchester reliability and media security. System boots DOS 2.0 from disk. Fast access drives you a very cost effective solution to high capacity storage and data security.

10 MB
1295 List 1495

**1 YEAR WARRANTY
48 HR. REPLACEMENT**

ADD 3% FOR CREDIT CARD USE



STATEWIDE

MICROELECTRONICS, INCORPORATED
10 East 22nd Street, Lombard, IL 60148

TOLL FREE (800) 882-8311
IL: (312) 932-0890

Price includes UPS surface freight and insurance. Add \$10.00 for two day air service. For fastest delivery send certified check or Credit Card. Personal checks take 18 days to clear. IL residents add 7% sales tax. Corporations & institutions call for purchase order details.

IBM is a trademark of IBM Corp.
Irwin is a trademark of Irwin Magnetics.
Cogito is a trademark of Cogito Systems.

CIRCLE 538 ON READER SERVICE CARD

Company Offers FREE OVERNIGHT DELIVERY!!!

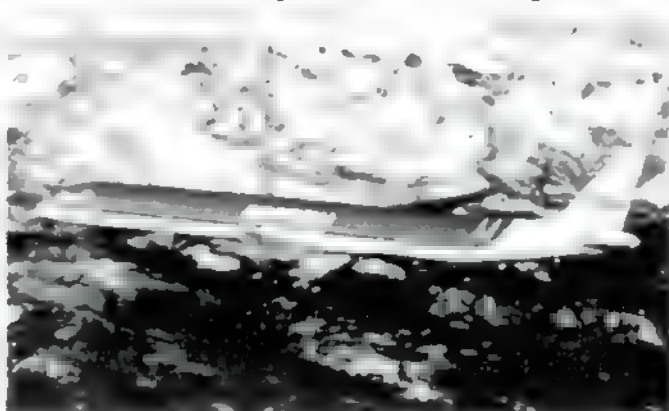
New customer service policy expected to set a new standard in the mail order industry!

BY MICHAEL CHRISTOPHER

GARDEN CITY, N.Y.—Mr. David W. Pasternack, President of Logisoft, a major IBM PC software and hardware distributor, has announced the inception of a unique new customer service policy. . . . free overnight courier delivery on their entire product line.

In a recent interview, Mr. Pasternack stated that "We feel our new free overnight delivery service will set a new standard in the computer software mail order industry. In a study we conducted, we found that in addition to competitive pricing, expedience was a factor utmost in our customer's minds. Whether their order was \$300 or \$3000, the need to get their package as soon as possible was the same. Under our old procedures, between processing and shipping time, it could take up to a week and a half to two weeks for an order to arrive. With our new courier service, an order can be processed, shipped, and arrive in our customer's hands in only 3 working days. . . . at no additional charge!"

The company is using Emery Worldwide to handle the large number of packages being shipped each evening for next day delivery. "We chose Emery for their competitive pricing structure and excellent delivery record", said Mr. Pasternack. Emery was quoted as saying, "This makes Logisoft the largest single Emery account in the New York Metro area.



LOGIC TIP OF THE MONTH

Choosing software can be mind-boggling. With the proliferation of publishers, how do you choose. Analyze your needs. . . what specific tasks do you want to perform. Read the software reviews; an excellent way to evaluate a package. Ask around. . . you'd be surprised how many associates may be using a package similar to your application. Finally, choose the best package (not always the most expensive). Upgrading will end up costing you more. Remember the key word is research.

TOLL-FREE SUPPORT A Smashing Success

GARDEN CITY, N.Y.—A survey of Logisoft's toll-free technical support policy was done to see if it warranted the continued costs of the 800 toll-free number, personnel costs, etc. After careful monitoring of these calls (both pre-sale and after sale) it was found that 92% of the calls were for legitimate technical support questions rather than for answers already contained in the softwares' operations manual. As a result of the survey, the decision has been made to continue toll-free support as an important part of their customer service.

This service consists of assisting with:

- Hardware requirements
- Initial boot-up procedures
- Initial software configuration (printers, disc drive, etc.)
- Back-up procedures
- Defective program determination
- Alternative program recommendation
- Return policy

Logisoft's Lowest Price Guarantee Still Effective

GARDEN CITY, N.Y.—Logisoft, Inc. has indicated that their long time policy of guaranteeing the lowest prices in the mail order market is still being offered and will not be affected by their new free overnight delivery service. "We will continue to beat any price by \$10" a company spokesman said. "We'd be crazy to fool with success", he stated; "since the inception of our lowest price guarantee, sales have skyrocketed."

When asked how Logisoft could afford to give their customers free overnight delivery plus beat any price by \$10, they replied "Buying Power". "Very simply", they said, we buy at the best possible prices and pass those savings along to our customers".

CONTINUOUS STATIONERY: BIG BUSINESS, But "Where's The Class?"

NEW YORK—The growth of Logicforms, Inc., a member of the Logic Group, has been phenomenal. Mr. Ralph Corso, President of Logicforms explains why. "Up until now, buying continuous stationery through the mail has been a take what's available situation". "First off", he said, "almost all mail order firms offer only stock letterheads & envelopes with limited typestyles, colors and stock logos from which to choose, but, 'where's the class'?"

"The individual style and design of a letterhead", said Mr. Corso, "reflects the professionalism and personality of a company and should not have to change because they now have a printer and the need for continuous stationery. While other mail order firms are limited in the variety they can offer, Logicforms specializes in custom stationery. Logicforms offers a large selection of quality paper, ink colors and special effects such as thermography, blind embossing, foil stamping and multi-color printing." Mr. Corso went on to say that

"whether a customer chooses to supply his own artwork or printed letterhead, or wishes to select from our vast array of stock designs. . . We are the Logical Choice".

For a free sample/pricing kit and a handy re-usable shipping envelope for artwork, simply call toll-free 1-800-645-3491 or send a sample of your current stationery for a free firm price quote. Mail to Logicforms, Inc., 300 Garden City Plaza, Garden City, N.Y. 11530

TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

LOGICSOFT INTRODUCES...
An Incredible New Service Breakthrough!

FREE OVERNIGHT DELIVERY!

VIA... **EMERY**
WORLDWIDE

PLUS... We'll Continue To
Beat Any \$10
Price By...

THAT'S RIGHT! OUR LOWEST
PRICE GUARANTEE IS STILL
EFFECTIVE!

SOFTWARE

Immediate Replacement on any Defective Product!

WORD PROCESSING

Wordstar 2000	Lowest Price
Wordstar Pro Pac	\$275
Wordperfect	\$295
Microsoft Word with Mouse	\$289
Multimate	\$269
Peachtext 5000	\$195
Volkswriter Deluxe	\$169
Easywriter II/Speller/ Mailer	\$195
Edix & Wordix	\$255
Finalword	\$225
Samna Word III	\$319
XyWrite II Plus	\$259
Think Tank	\$139
Wordplus (Oasis)	\$115

DATA BASE MANAGEMENT

Knowledgeman	\$275
TIM IV	\$269
R Base 4000	\$295
dBASE III	\$369
dBASE II	\$295
Quickcode III	\$179
Condor III	\$325
Data Base Manager II (Alpha)	\$195
Intasat Plus	\$295
Friday	\$169
pts file & pts report	\$165
Revelation	\$759
Powerbase	\$265
Personal Pearl	\$229

INTEGRATED/SPREADSHEETS

Enable	\$549
Smart Software	Lowest Price
Aura	\$299
Open Access	\$385
Electric Desk	\$219
Framework	\$369
Symphony	\$429
Lotus 1-2-3	\$309
Corporate MBA	\$509
Supercalc 3	\$195
Multiplan	\$135
TK! Solver	\$269

GRAPHICS

BPS Graphics	\$289
Fast Graphs	\$199
Chartmaster	\$279
Signmaster	\$195
pts graph	\$ 85
Graphwriter Combo Pak	\$475
Energraphics	\$269
PC Draw	\$295
Chart (Microsoft)	\$179

**Over 400 Additional
Titles In Stock!**
All factory sealed, complete
with manuals and full
Manufacturer's Warranty!

FINANCIAL/SCHEDULERS

Managing Your Money (Tobias)	\$159
Financier II	\$115
Dollars & Sense	\$115
Market Manager (Dow Jones)	\$229
Market Analyzer (Dow Jones)	\$269
Market Microscope (Dow Jones)	\$259
PCPPF II (Best)	\$169

Microsoft Project... \$175

Harvard Project Manager	\$319
Project Scheduler (Scitor)	\$195

LARGEST SELECTION OF TAX PACKAGES

LANGUAGES/UTILITIES

Concurrent CP/M86 w/Windows (DR)	\$225
Pascal MT + (DR)	\$235
PL/1 (DR)	\$479
Display Manager (DR)	\$359
Access Manager	\$269
Lattice C Compiler (Lifeboat)	\$299
CIS Cobo 86 (DR)	\$479
Pascal Compiler (MS)	\$245
C Compiler (MS)	\$325
Microsoft Sort	\$159
Cobol Compiler (MS)	\$495
Business Basic (MS)	\$369
Fortran Compiler (MS)	\$245
Prokey 3.0	\$ 89
Norton Utilities	\$ 55
C Food Smorgasbord	\$119
Crosslink XV	\$105

Prices subject to change without notice

SEE REVERSE SIDE FOR ACCOUNTING SYSTEMS AND HARDWARE



* NO SURCHARGE for VISA or MasterCard * Purchase Orders Welcomed from
Qualified Institutions...NO SURCHARGE! * No Sales Tax on Orders Outside N.Y.
State * Please add 2% for handling and insurance (int'l orders add 5%) * Payment:
MasterCard, VISA, American Exp., C.O.D., Money Order or Check

1-800-645-3491

New York State 516-741-0043 Canada

416-251-2354

Domestic/International Telex

286905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE
A Member of the Logic Group



300 Garden City Plaza, Garden City, New York 11530

CONFUSED OVER ACCOUNTING SYSTEMS?

We don't blame you, that's why we invite you to give us a call.

We've evaluated over 50 of them and just because you choose to buy through a mail order company shouldn't mean you have to sacrifice service...We want to take the time to assist you before you buy. We realize that an accounting system can add up to a sizeable investment and helping you end up with the right package for your money is what doing business is all about.



INFORMATION UNLIMITED SOFTWARE (IUS)

- General Ledger • Inventory
- Accounts Payable • Order Entry
- Accounts Receivable

\$295 Per Module

Payroll \$359
Financial Series (G/L, A/P, A/R) \$859

PEACHTREE SERIES 8

- General Ledger • Accounts Payable
- Accounts Receivable • Payroll • Inventory
- Sales Invoicing • Job Costing

\$375 Per Module

ACCOUNTING SYSTEMS

OPEN SYSTEMS

- General Ledger • Accounts Payable
- Accounts Receivable • Payroll • Inventory
- Sales Order Processing • Job Costing
- Material Management • Fixed Assets
- Purchase Order Processing

\$399 Per Module

REALWORLD (MBSI)

- General Ledger • Accounts Payable
- Accounts Receivable • Payroll
- Order Entry/Inventory

\$575 Per Module

TCS

- Client Write Up

\$1195

STATE OF THE ART

- General Ledger • Accounts Payable
- Accounts Receivable • Payroll • Inventory
- Sales Invoicing

\$479 Per Module

Time Keeping & Billing \$679

BPI

- General Ledger • Accounts Payable
- Accounts Receivable • Payroll

\$395 Per Module

Inventory \$529
Job Costing \$529

GREAT PLAINS SOFTWARE

- General Ledger • Accounts Receivable
- Accounts Payable • Payroll • Inventory

\$579 Per Module

HARDWARE

AST RESEARCH

AST-5251 \$699
AST-SNA \$699
AST-BSC \$699
AST-3870 \$749
SixPakPlus 64k \$265
MegaPlus II 64k \$265
I/O Plus II \$125
Monograph Plus \$425

QUADRAM

Quadboard 64k \$265
Quadlink \$449
Quadcolor I \$195
Quadcolor II \$465
Quadmodem (internal) \$570
Quadmodem (external) \$625

IDEA

IDEAmax 384 \$259
IDEAplus Lowest Price

KENSINGTON MICROWARE

MasterPiece \$115

DCA

IRMA Board \$989

STB

Super Rio \$499
Rio Plus II \$249
Graphics Master \$545
Graphics Plus II \$345

MA SYSTEMS

Peacock Color Board \$245

TECMAR

Captain \$265
Graphics Master \$475

HERCULES

Graphics Card \$335
Color Card \$175

PARADISE SYSTEMS

MultiDisplay Card \$285
Modular Graphics Card Lowest Price

PERSYST

Monochrome Card \$199

MYLEX

Chairman \$495

PLANTRONICS/FREDERICK

Colorplus \$375

MOUSE SYSTEMS

PC Mouse \$145

ORCHID

Blossom, 64k \$235

HAYES

Smartmodem 300 \$199
Smartmodem 1200 \$485
Smartmodem 1200B(w/Smartcom II) \$399
Cable (IBM) \$25

NOVATION

Smart-Cat 103/212 \$439
Smart-Cat 103 \$185
Smart-Cat Plus \$355

KEY TRONIC

Typewriter Keyboard (5150) \$159
Deluxe Keyboard (5151) \$169

US ROBOTICS

Auto-Dial 300/1200 \$455
S-100 Modem \$345

MEMORY CHIPS

(200ns) 64k \$45

Immediate Replacement on any Defective Product!

THE LOGICTRAK DD5

One of the finest Diskettes available! Every one is certified 100% Error Free!

Our 5 1/4" double sided, double density, soft sector, floppy diskettes are manufactured to the highest tolerances. Each diskette carries the **Logicsoft Lifetime Guarantee**. If any of our diskettes fails to format or exhibits any data retention errors, we will replace it, **Free of charge**. Diskettes come complete in our handy easy-stor reusable box; pre-labeled for fast, easy reference. Packed ten diskettes per box. These are the same diskettes trusted by the largest, software publishers in the country

20 + Boxes

\$235
Per Disk

10-19 Boxes

\$250
Per Disk

2-9 Boxes

\$299
Per Disk

1 Box

\$399
Per Disk

LIFETIME GUARANTEE!

LOGICSOFT can assist you in three major areas with Toll-Free Support:

- Hardware requirements • Initial boot up procedures • Initial software configuration (printers, disk drive, etc.) • Back-up procedures • Defective program replacement
- Alternative program recommendations • Software return policy

1-800-645-3491

New York State 516-741-0043 Canada 416-283-2354 Domestic/International Telex 286905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE
A Member of the Logix Group

300 Garden City Plaza, Garden City, New York 11530



TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

PROFILE

Taking a Close Look At IBM's New Role

Automation's author points to IBM as an example of his newly coined term.

BY MARTIN PORTER

NEW YORK—If John Diebold has a singular talent, it is his ability to spot a management trend and give it a name. He proved this over 30 years ago when, at the age of 26, he coined the term "automation" in a book of the same title.

Today, as the chairman of the Diebold Group, a management and technology consulting firm for the Fortune 500, Diebold is still creating names for business phenomena and making one for himself in the process. In his latest book, *Making The Future Work* (Simon & Schuster, 1984), Diebold has devised a new term, "intrapreneurship," to describe an emerging management trend, one that matches the organization of IBM's Entry Systems Division (ESD), which produces and sells the IBM PC.

Diebold defines "intrapreneurship" as follows: "Setting up a small, independent division under the corporate umbrella that is, by all appearances, an entrepreneurial start-up, but is, in fact, a company within a company."

Bold Intrapreneurs

Obviously, the success of ESD and its PC family hasn't been missed by business managers; calculated risk taking and "close-to-market" decision making are characteristics of many business behemoths trying to move quickly with the times. Diebold agrees that the success of ESD has encouraged other corporations to take the "intrapreneurial" route. As a success story, however, he says ESD uniquely illustrates the predicament of a corporate start-up that itself grows into a giant.

"A big company has tremendous problems when it tries to maintain a condition of very



John Diebold

rapid growth along with an environment where people can take risks," Diebold explains. "The important thing is to establish an environment where employees can not only take risks, but where, if they fail for a perfectly good reason, they haven't killed their career."

IBM is a company Diebold seems to savor with a connoisseur's eye for management

skill. He feels IBM has already taken a significant lead in the race for future technical opportunities because of its ability to sustain the intrapreneurial spirit. It is in this respect that IBM's competitor in the PC market, AT&T, has yet to prove itself a vigorous competitor.

"I think you are starting to see this emerging attitude from AT&T," Diebold says. "I think AT&T has already made big strides. But it has a long way to go."

Risky Business

So does the rest of the industrial world, for that matter. Diebold feels that European and Japanese companies both have inbred traditions that preclude the creation of intrapreneurial units. "Their whole society works against risk taking, against innovation of that kind. Failure is anathema to them. If you are a young person and you try some innovation and you fail, your career is blotted for the rest of your life."

Diebold encourages corporations to make changes of this type, for the sake of a better society and a more profitable bottom line. He has modeled his own New York City business upon these management beliefs. With an assortment of IBM PCs and Wang word processors, his staff analyzes and produces reports for nearly 700 assignments per year. Diebold coordi-

nates seven international offices and collaborated on his new book with a "telecommuter" who shuttled the manuscript between New York and Boston by wire.

White-Collar Change

Office technology creates organizational changes of its own, Diebold says. The coming age of artificial intelligence is expected to impact the jobs of white-collar workers the way industrial automation altered the blue-collar ranks. However, Diebold's theory of automation is less apocalyptic than other technical oracles: "The only way to save jobs is through automation," he declares. "If we don't do it we will be driven out of a lot of fields. Computers change the way you do your job. They change the job you do, and they change the society in which you operate."

Diebold recognizes the dichotomy posed by technology in the workplace—dehumanization versus freedom. It is for this reason that he describes IBM's selection of a mustachioed-tramp with baggy pants as a "brilliant choice" for the PC ad campaign.

"The concept of the 'company man' or 'organization man' is outmoded. Today's emphasis is on individual self-discovery and expression," he notes in his book. Meanwhile, his pet suggestion to corporate managers these days is: "Treat talent as capital."

Even prominent industry consultants have "off days," however. Diebold used the success of IBM's Entry Systems Division to illustrate "intrapreneurship" at work in a recent interview, but his book takes Convergent Technologies as a principal example. He describes at length the launch of the WorkSlate, which, like the PC, was rolled out the door in only 1 year by an independent business unit within a large company.

"Intrapreneurship" doesn't guarantee success, it appears. The lap-computer offspring of Convergent Technology's "intrapreneurial" experiment has since been mothballed because of lackluster sales.

Where There's a Will, There's a 'Ware

Is there personal computing after death—or only Worm Processing?

The closest thing to software for the afterlife may be a program that helps you create and print a statutory will and trust that's valid in the state of California. This piece of public-domain software has a name that sums up both its noncommercial status and its function: *FreeWill*.

FreeWill is available from the San Francisco PC Users Group's software library for \$6. Ask for disk 51 when you write to 4411 Geary Blvd., Suite 33, San Francisco, CA 94118.

According to software librarian Charlie Vella, *FreeWill* started out as a user-supported program, with a requested donation of \$10. Letters and payments sent to the address listed in the program, however, were returned with no forwarding address—an ominous sign!

In any case, a do-it-yourself, last-will-and-testament program may not be viable as a user-supported product. By the time there's evidence that someone used the program without payment, that user is far beyond the reach of the program's creator—but closer, perhaps, to the Creator.

—James Langdell

Okay, okay, okay. If you're going to insist on specifics, we can tell you outright that The Shoebox Accountant retails for \$395. We realize we can probably disclose this detail without appearing too pretentious, simply not mentioning that for this incredibly marketable price, The Shoebox Accountant offers a totally integrated small business accounting system, complete with tutorial, queuing files, and CYMA's powerful reporting capabilities, and capsulizes the complete system on a single diskette. After all, as our professional peers, you're entitled to a little inside information. But you know us: subtlety is our hallmark.

Nice Box.
Fully Integrated.
\$395.



The Shoebox Accountant:™ A complete accounting system for small business. 2160 East Brown Road, Mesa, Arizona 85203. 1-800-292-2962.

CYMA
McGraw-Hill

CIRCLE 112 ON READER SERVICE CARD

Just a Few Reasons We're Number One.

When you're figuring which tax software investment will give you the greatest return, consider this. More people buy HowardSoft's Tax Preparer for their IBM-PC, TI Pro, or Apple Computer than any other tax package around. Now, if that's not reason enough to choose HowardSoft for yourself, here are just a few more.

It's easy.

HowardSoft's clear instructions walk you through the program and simply detail the most-used forms and schedules.

It's accurate.

With your tax form right on the screen, you enter information just once. Tax Preparer calculates quickly and accurately, makes changes automatically, and even re-checks for consistency throughout your return. It delivers IRS-accepted printouts, error-free and ready to mail.

It works hard.

Tax Preparer keeps records completely perfect order projections round.

your on-going accessible, in and ready for all year-

It's reasonable.

HowardSoft's years of experience with tax related software really pay off. You get the features of high priced packages at a fraction of the cost. Plus inexpensive updates for easy filing year after year.

It's unique.

No other software does so much. Tax Preparer provides 21 separate IRS forms and schedules. It gives you unlimited itemizing, word-processor-type editing, and help messages at the touch of a key. And it even has a built-in tax planner for projecting the future. You can call or write for even more details than these. When you have all the facts it all adds up. There really is no reason to buy any other tax package than Tax Preparer by HowardSoft.

HowardSoft™
The software investment
you can count on.

8008 Girard Avenue, Suite 310
La Jolla, CA 92037 (619) 454-0121

CIRCLE 327 ON READER SERVICE CARD



IBM-PC is a trademark of International Business Machines Corporation. Apple Computer, Inc. is a trademark of Apple Computer, Inc.

Copyright

MAYDAY! Answers Emergency Calls

Tap into a troubleshooting hotline dedicated to computing problems.

BY DEAN HANNOTTE

MAYDAY!: The Software Support Service

Teletech Service Corporation
31 Memorial Dr.
Avon, MA 02322
(800) 343-4076
(617) 584-3671
in Mass.
List Price: \$200 for 120 minutes.

AVON, Mass.—Third-party hardware support is familiar to everyone who doesn't send all their appliances to the factory for service. Now, the third-party concept has crossed over into software with the advent of MAYDAY!: The Software Support Service.

Picture this: You're trying to get your favorite word processor to add italicized footnotes to your request for a raise. But try as you may, it just won't do what the manual says it will. Do you call your dealer? No. It's Saturday, they'll only put you on hold anyway, and the brat who answers the phone reminds you of your nephew.

How about the vendor? That's a good idea—if you can find them and someone actually answers the phone. Of course, to read the fine print in the warranty, you'd think that if you open your mouth, you'll probably get sued for damaging their diskette.

MAYDAY! was damaging for times like these. It offers a friendly voice you can reach 18 hours a day, 6 days a week, for those times when you're sure you've followed the directions, nothing you try works, and you're ready to toss your computer out the window and into your neighbor's badminton net.

Naturally, nobody and nobody's army could ever be experts on every package ever written for every computer. So

Teletech concentrates on the "Top 40" microcomputers, beginning with the IBM PC. For operating systems, they stick to MS-DOS and CP/M. And for software, they focus on the most popular spreadsheets, word processors, and home applications—350 in all.

Although MAYDAY! is actually a service contract, you'll find it at your local computer store deceptively packaged in the same kind of box that software is usually sold in. And, like software, you get "documentation" too—in this case, a standard IBM-size three-ring binder containing the *MAYDAY! Primer and Troubleshooting Guide*.

The illustrated and well-written Primer covers the sorts of things every computer user should know. Its intent is clearly to save the customer (and Teletech) some unnecessary phone calls. Chapters include "A Whimsical History of the Computer," "Housetraining Your Computer," and "Software Needs Love, Too." You're not contractually obligated to read every sentence.

You also get a glossary that defines "terminal" as "a large building where computers take off and land," "menu" as "all you can compute for \$2.99," and "binary" as "a transsexual canary." The glossary you won't need.

The Trouble Shooting Guide

Speaking of Computers: Everything Must Go!

Regarding IBM's introduction of the AT: "Companies called us and asked, 'What can we do with our old XT's?' Our answer was sell them to your employees, send them to Africa, but get them the hell out of the states."

—John Levy, vice-chairman of General Micro
(a midwestern chain of computer retail stores)

holds tips concerning known glitches in *Accounting Partner*, *Accounting Plus*, Microsoft's BASIC Compiler and BASIC Interpreter, *CalcStar*, *CROSS-TALK*, *dBASE II*, Lotus's *1-2-3*, *MBASIC*, *MultiPlan*, *Perfect Filer*, *Perfect Writer*, *R:BASE 4000*, *SuperCalc*², *VisiCalc*, *Word Plus*, and, of course, *WordStar*.

Dial-a-Hacker

What you're really buying, of course, is telephone support time. MAYDAY! costs \$200 for 120 minutes, and you must use this up within a year after purchase. Any one phone call "costs" you a minimum of 3 minutes, with calls longer than that rounded up to the next 15-second increment. You're even given a telephone log so you can keep track of how many minutes you've used. And since you pay for the call, you may want to give some thought to moving to Massachusetts. But if all this sounds pricey, compare it to IBM's telephone service, which charges \$380 for seven phone calls relating to only fifteen products.

Teletech pitches MAYDAY! heavily to dealers ("MAYDAY! looks just like software," touts the brochure) because it relieves dealers of the considerable headaches of customer support. According to Teletech, Computerland's six Boston stores now bundle MAYDAY! with every computer system they sell, including PCjr.

Answering the MAYDAY! hotlines sounds like fun. The pool of 40 or so technicians on the other end have at their command a database of 20,000 previously solved problems. In many cases, your answer is only a few keystrokes away. If the answer isn't found in a few minutes, however, you hang up while the technician digs

deeper. You're guaranteed a call-back within the hour, either with the answer or a fascinating explanation of why your question is such a good one. Theoretically, you always get an answer, even if it takes a week.

Actually, this unique database predated the MAYDAY! concept. It was developed by Software Wholesalers, headquartered in Massachusetts. In distributing 300 software packages to 2,000 dealers, it found itself answering the same questions over and over again. So an ad hoc database of solved problems slowly grew. In 1982, the idea of making this treasure trove available to users in addition to dealers was born, and earlier this year, Teletech Service Corporation and MAYDAY! were the results.

And what if it turns out that your word processor can't do italicized footnotes after all? In that case, you might be tempted to ask if you should have bought another word processor. If they happen to know the answer, MAYDAY! technicians will gladly tell you. In fact, a speaker for Teletech predicts that eventually the meaning of "software support" will expand to include answers about software in general, and even help in configuring a new system.

Limitations

For now, however, MAYDAY!'s software base won't satisfy everyone. IBM's BASIC compiler is not supported, and neither is IBM's *Personal Editor*. For some reason MAYDAY! doesn't support any software supplied by any computer manufacturer—only third-party software. So, if you run into trouble with the *Personal Editor*, or *WordProof* (IBM's spelling checker), or any other IBM product, you're right back out on a limb.

Although MAYDAY! may not yet patrol everybody's territory, and though it can't actually fix any software bugs it finds, it can still provide valuable hand-holding to anxious newcomers who hark to the software standbys. If Teletech's claim of 10,000 sales a month is accurate, a new information utility may be in the making. ■

FOR \$30 YOUR COMPUTER WILL RESPECT YOU IN THE MORNING.

Your computer thinks you're a real moron. So do the big-ticket software packages like Symphony, 123, Wordstar, etc. Every morning, when you boot your IBM PC or compatible, both hardware and software treat you as if you had a two-digit IQ and the reflexes of a turnip.

First, you plod your way through all those nested menus. Once into your application, the software thinks you're too ignorant to care about multiple-keystroke commands. And the hardware assumes a screen cursor that moves at ten characters per second is the fastest thing you can handle.

Even before you invoke insulting software packages, the system assumes you are one lousy typist who can't possibly exhaust the capability of a 16-character type-ahead buffer. If you do get more than 16 characters ahead, it just throws all those characters away. But then, someone as stupid as yourself can't possibly be doing anything important.

And heaven forbid you should want to leave your computer unattended. If some co-worker doesn't blither by and inadvertently reformat your hard disk or type garbage into your spread sheet, you should still plan to return soon. Nobody has seen fit to protect the phosphor on your screen with a blanking mechanism.

ANNOUNCING MOTHER JONES' SON'S SOFTWARE

About thirty-two years ago, Mrs. Jones was just getting over a large bellyache. She gave birth to a son, Morris. Several months ago, Morris got rid of a large bellyache of his own. He gave birth to about 2000 lines of assembly language code that slapped a little respect into his computer. For \$30 you can adopt one of Morris's babies. For a little more, you may even have the source code. Then you can really do some *genetic engineering* on your rude little bucket of sand.

We call the package "MJ." It gives MS™-DOS much more respect for you. A serious *attitude adjustment*. It downright burns new synapses into Symphony, 123, Wordstar, and every other package we know of. It even gives Sidekick a kick in the rear end.

If you spend any time at all on your IBM PC or compatible, can you afford *not* to spend \$30 for a little respect from your computer?

MOTHER JONES' SON'S SOFTWARE PEDIGREE

Morris Jones' brilliance became legendary at Amdahl. Singlehandedly, within ninety days, Morris wrote the design-entry and simulation program that produced the Amdahl 5860. That accomplishment earned him the title of *principle engineer*. There were just a few such individuals in all of Amdahl. As you might guess, there's now one fewer.

As for MJ's 2000-plus lines of PC brain surgery, how good is it? Let's put it this way. Most of the really good silicon surgeons learned assembly language by studying other people's well-written assembler source

ABOUT MOTHER JONES' SON'S BABY

MJ comes to life right after your system does. It co-exists with MS-DOS (2.0 or higher and at least 96KB of memory), Symphony, 123, Wordstar, Sidekick and most of the known Universe of currently available PC programs. You can invoke MJ without leaving your program, and do the following:

1) MJ permits you to open a window and reassign a key to produce up to a thousand keystrokes. Not only can such a redefined keystroke send you from MS-DOS, smoking past Wordstar initial menus and smack into your edit file, but it can eliminate forever those infuriating two-key commands. Suppose you want to turn off hyphenation and justification (so your business correspondence doesn't look like a computer-generated form letter), get rid of the help menus (because you're no Neanderthal), and set up indented margins? Instead of typing

of "oh"jh2"of10(cr) or50(cr) you can program one key to do it. If you spend much time in Symphony or 123, MJ will make you equally brilliant. Especially to the local computer wizard looking over your shoulder, trying to figure out how you do so much with so few keystrokes.

2) MJ allows you to speed up your screen cursor in five increments, from the present 10 cps to over 90 cps. If you've spent at least seventy-five cents in a video arcade, your reflexes are more than up to this feature.

3) MJ expands the IBM PC keystroke capture from 16 characters to over 1000 characters. No more beeping, telling you the buffer is full and trashing your input. Your computer will gain new respect for you, as you keep several large steps ahead of it.

4) MJ allows you to lock your keyboard while you take a break. Without leaving your application. So nobody can undo a morning's work. Or a week's. When you return, type your password to bring the interrupted application back to life.

5) And then there's a few miscellaneous things. If you paid your own hard-earned money for a PC, why not protect your phosphor? MJ can make your screen go blank after two minutes of screen/keyboard inactivity. So your bank account won't go blank. MJ also makes the control-C, control-S and control-Q keys function properly. Too bad IBM didn't.

code. MJ source code is good enough, tight enough, that we're not at all ashamed to make it available to you. *An evening with MJ source code could well beat a whole semester of reading the swill you'll find in the local college book store.*

COPY PROTECTION AND PROGRAM LICENSES

If it weren't enough that your system treats you like a moron, how about those absurd copy protection mechanisms? And license agreements you sign, knowing you have no choice but to violate them or risk going out of business?

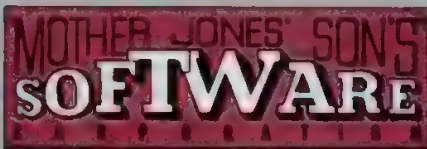
MJ is not copy protected. We even offer you the source code. Copy the software for your friends, if you wish, provided you send us the discounted price when you do. Here's our individual program license agreement (blanket corporate licenses are available):

You agree to treat this software as if it were a book, with the exception that you are granted the right to make backup copies. You are free to take it with you to another computer, provided there's no possibility somebody might be using it on your own computer. You are free to loan it to someone, provided you cannot use it while it is on loan. You are free to sell it, so long as the new owner agrees to all these conditions. Unlike a book, you may even copy it and give it to a friend, provided your friend signs this agreement and you send us the list price of the software less the \$10 in handling and processing you've saved us. If you build our source code into your own integrated application, for resale, we won't be unreasonable in negotiating a royalty arrangement.

As for warranties, you may return defective software within thirty days for a replacement. But just like any other self-help book, it's value to you is what you make of it. No matter how badly it damages your life, or that of your customers and friends, we're not obligated to do anything about it.

Now for the ah fangs. Violate this agreement and our attorneys will see to it that life on earth, as you know it, is completely ruined. Also you agree that, 30 days after you violate this agreement, ownership of your eternal soul automatically passes to us, and we have the right to negotiate the sale of said soul to the first smoking, blood-drenched apparition with fangs (SBDWF) that meets our price. The SBDWF may collect your soul at any time of his/her its choosing.

Given the remotest chance some supernatural entity could actually enforce the "soulcatcher" clause, you'd be a real bozo to take any chances. But then we give you more credit for intelligence than does our competition. So does Mother Jones' Son's software.



6310 Cabellaro Blvd., Buena Park, CA 90620
Telephone 714/522-7762

Please send me (check one)

- ☐ Just the MJ object program for my IBM PC, XT or compatible for \$30
☐ Both the MJ object program and the assembly language source code for \$70
California residents include 6% sales tax
\$5 handling and postage for all orders

\$ _____ Total amount enclosed-authorized

My signature below, besides being a possible credit card authorization, indicates my agreement to all the above terms

- ☐ My check is enclosed
☐ Please bill my ☐ VISA ☐ MASTERCARD

Card number _____	Expiration _____
Signature _____	Date _____
Print/type full name _____	Title _____
Company _____	Phone _____
Address _____	
City _____	State _____ Zip _____

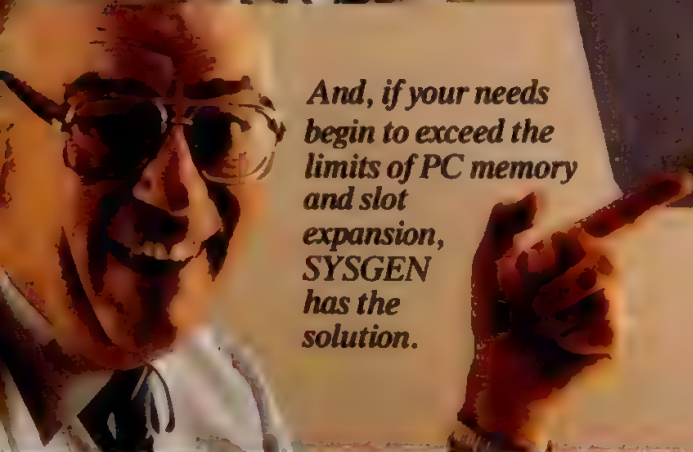
6310 Cabellaro Blvd.
Buena Park, CA 90620



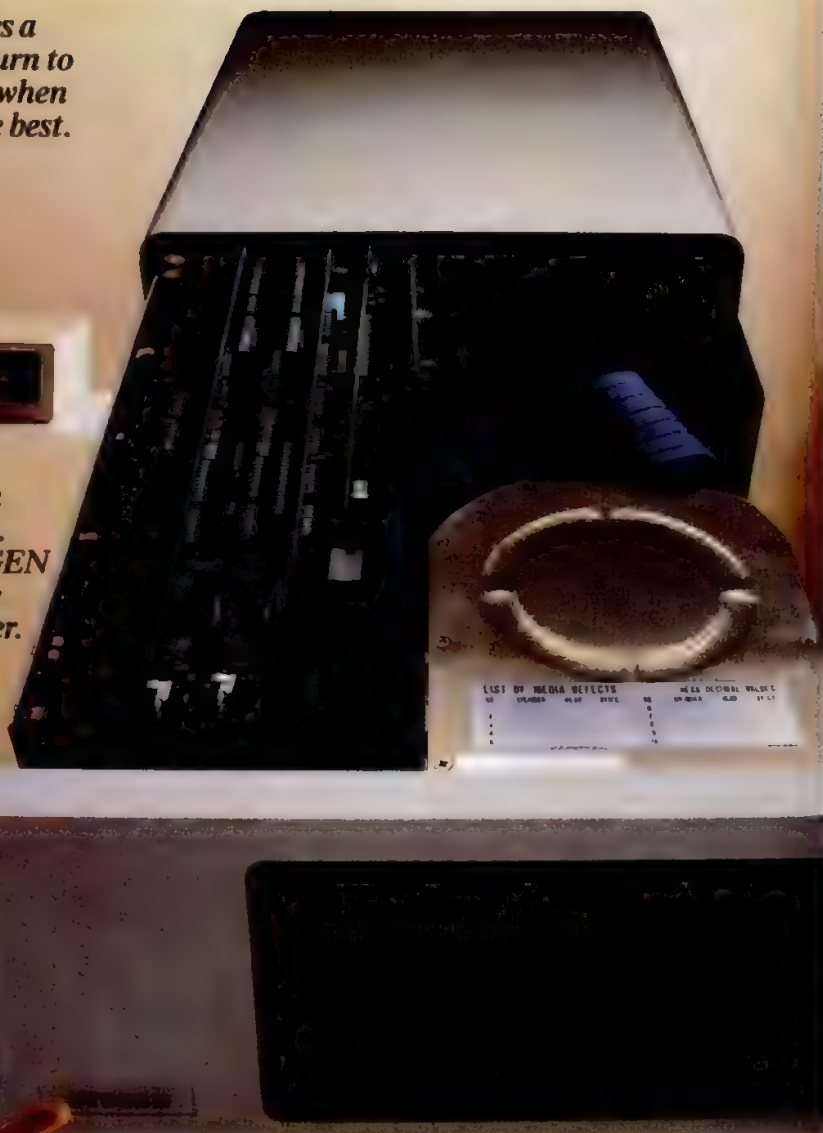
*Equipping a PC for business takes a hard disk. Turn to **SYSGEN™** when you want the best.*



*Smart disk users insist on tape for data file back-up. **SYSGEN** is the leader.*



*And, if your needs begin to exceed the limits of PC memory and slot expansion, **SYSGEN** has the solution.*



18 Megabytes and 6 expansion slots for the PC, XT, or AT™. \$1995.

For demanding PC owners who need more versatility and memory, Sysgen introduces a powerful, reliable, and unique solution: The DISK I/O™.

It includes 6 new expansion slots for your choice of plug-in

boards, plus, an 18 MByte hard disk—all for slightly more than a hard disk alone.

Sysgen offers the full range of expansion, storage, and tape back-up solutions with the best performance ratings for the IBM® PC, XT, AT and compatibles.

For more information on the Sysgen family of expansion products contact your local dealer.



SYSGEN
INCORPORATED

47853 Warm Springs Blvd.,
Fremont, CA. 94539
(415) 490-6770 Telex 4990843

Buyer's Ed: Taking Demos for a Spin

Watch out for price curves when test driving your next potential program purchases.

BY ERIC FREEDMAN

NEW YORK—The "free home demonstration" of a few years ago isn't necessarily free anymore. At least, not when it comes to demonstration programs available on disks for the PC. With the price of some demos hitting \$25, two questions are raised. Why would anyone buy a demo disk? And what is a company's strategy in selling one?

For the consumer, a good demo disk can provide an extra, and important, dimension of information to help assess a program being considered for purchase.

But why spend money for a demo when the local retailer can demonstrate the product for you? Many PC users don't live close to dealers, and dealers don't always demonstrate all the items they sell. Also, you can spend as much time with a demo at home as you want. And the expense is generally minimal compared to the price of the product; in many cases, the company will credit the demo price toward the purchase of the program.

But why do companies offer demos? After all, most PC software products are either demoless, or offer demos solely to retailers. Companies turn to demo disks for consumers for reasons including competition for shelf space at retail outlets, the inability of retailers' sales staffs to master the subtleties of all of the huge number of programs available, the high costs of alternative marketing strategies, and a demo's potential to sell a product in a way even the slickest brochure or ad can't match.

"It was an easy way for people to see what the product can

do," explained Gene Brown, president of C Source, Inc., which sells *EC Editor* (\$5 demo), a text editor for programmers. "Since we don't distribute through retail outlets, we need a way to show how the editor works. It's an inexpensive way for us to get our product out there."

Quest Research, Inc., president Lawrence M. Beyl said his company decided to offer demos for its *It's My Business* program (\$20 demo) even though it hadn't done so for other items in its line. "Our product has so much in it, we felt the product would tell it for us." SoftCraft, Inc., offers a \$7.50 demo for *Fancy Font*, its personal typesetting program for dot matrix printers. Vice-president Bob Fenchel says, "It's worth our while for two reasons: to get people to see what it does—the quality of its printing—and as a test vehicle."

Beverly Lagas, marketing communications manager for DayFlo, Inc., which sells the *DayFlo* database manager (\$10 demo), said, "We have a rather unique product and we thought the only way potential users could appreciate it is to see it." Lagas added that, "You can't rely on the dealers—who have so many products—to demonstrate yours. Retailers don't like to serve the educational function."

Surprisingly, some companies don't keep statistics on

the proportion of demo buyers who go on to order their product. Others do.

Payoffs?

Kathleen Emerson, president of Design Trends, Ltd., which sells a trio of *SofTax* (\$25 demo) tax preparer packages, estimates that 25 to 30 percent of the firm's demos result in orders. The company also surveyed those who didn't follow up with a purchase. The most common reasons were that the user didn't try out the demo, in some cases they didn't even have a computer, or they kept it on file for a possible future order.

While most companies haven't ventured into the demo realm, some tried but found the approach failed to meet their expectations.

One of those is Ann Arbor Software, developer of the *Textra* word processing package, which discontinued sale of its \$3 test disk after about 6 months of advertising. President Scott Anderson explained: "We did some follow-up on people who got our demos. A lot of people weren't willing to spend the time working on it." Anderson said about 10 percent of those ordering the demos went on to purchase the program, "but the administrative overhead was a hassle."

Demonstrated Variety

Some demos allow users to input data of their own choosing, but within tight restraints. Others go further. As an example, the *EC Editor* demo is a limited-capacity version of the regular product, enabling users to design and manipulate an 8K to 10K file. "We wanted to give people enough so we can hook them," Brown said. In fact, those who need only a small programming editor may be able to manage with the demo alone, he observed.

Not all companies share that

philosophy. Demos for *DayFlo* and Software Solution's *Data-Ease* (\$10 demo) offer, in effect, flashy slide shows rather than a hands-on experience. They adequately illustrate the product, but leaves users without a feeling for how the programs respond to commands in real situations.

When asked about this, Lagas explained that the *DayFlo* demo was developed as an "online brochure." She said, "We're advertising to an audience that knows what databases are. We wanted it to be a completely hassle-free thing."

Similarly, the *Fancy Font* demo requires no user action other than booting up and calling the two short demonstration files. It then automatically prints the preset text in a variety of pre-ordained typefaces. Some commands are shown, but the user doesn't have the opportunity to input any of them. Fenchel said, "We're unique enough to show what the product produces," making intervention unnecessary during the demonstration.

Documentation

Don't expect a complete users' manual with a demo, although some test disks include them. However, the better demos all have adequate written instructions on booting (generally demos don't contain DOS), major product features, differences between the demo and the full package, price, and customer support information. System requirements should be fully set out in the documentation, and consumers should check them before ordering the package; The demo for one product we checked runs on a PC with two drives, but the full program requires a hard disk.

Of course, demos are not sufficient to evaluate software before buying. They represent, after all, a company's effort to put the most alluring face on its product. Used in conjunction with such other tactics as talking to fellow users and studying reviews, however, demo programs can play a key role in your personal or business software decisions. ■

IBM's Paternal Reaction

Regarding the poor early sales of the *PCjr*: "It did not perform as well as IBM expected, and they sort of took it personally."

—Dr. Ronnie Ward
Future Computing

THE PANASONIC SR. PARTNER™ NO PERIPHERALS NEEDED

Because they're already built-in. The 80-132-column printer. The 9-inch, high-resolution display. There's even a built-in 360K disk drive. Which all make the Sr. Partner a complete computer as is.

The Sr. Partner is IBM hardware and software compatible so you can run popular business programs immediately. The software bundle currently offered with the Sr. Partner is WordStar, VisiCalc, pfs:Graph, File, Report, MS-DOS 2.11 and GW BASIC.*

And with its 256K internal memory expandable to 512K, the Sr. Partner can run the new integrated software.

Built-ins also include expansion slots and parallel and serial I/O ports. There's even a built-in RGB monitor port so you can take advantage of the Sr. Partner's color and graphics capability.

If you want 10 megabytes of storage, choose the new hard disk Sr. Partner.

Both the Sr. Partner and the hard disk Sr. Partner come with an exceptional Panasonic warranty.*

For the dealers nearest you, call 201-392-4261. The Panasonic Sr. Partner. No peripherals needed. It makes the competition look like Jr. Executives.

Panasonic
Industrial Company



*Software bundle offer subject to change or withdrawal at any time without notice and is not available with Hard Disk Sr. Partner. **One-year limited warranty, 6 months on thermal printer head. Carry-in or mail-in service. Sr. Partner is a trademark of Matsushita Electric Industrial Company Ltd; WordStar is the trademark of MicroPro International Corporation; VisiCalc is the registered trademark of VisiCorp; pfs:Graph, File, Report are the registered trademarks of Software Publishing Corporation; GW BASIC, MS-DOS are the trademarks of Microsoft Corporation.

CIRCLE 140 ON READER SERVICE CARD

A Second Opinion On Diagnostics

Examine half-a-dozen programs that will check out your PC's inner workings.

BY BILL HOWARD

What does a PC diagnostics program have in common with a smoke detector, a life jacket, and a seat belt?

They're all reasonably cheap for what they do (and compared to what they protect)—and too many of us ignore them.

The reason you should know about diagnostics programs has to do with the most common way a computer breaks down: The disk drives gradually go out of whack. Once you get the drives put back in working order, they may be unable to read any of the data you wrote to disk while the drives were going bad.

Fortunately, any of the half-dozen diagnostics programs on the market—costing from \$35 to \$140—should give adequate warning of impending computer woes. They cover different territory from the diagnostics disk supplied by IBM with your PC.

The cheaper programs test only the floppy drives and report the results in plain English: pass, okay but not great, or fail. The more expensive programs add memory, keyboard, printer, and hard disk tests. They're compatible across a range of PC clones, especially the near duplicates such as those from Compaq or Columbia.

Checkpoints

The programs check some or all of these disk functions:

Disk speed, also called spindle speed. The drive should spin at 300 rpm.

Head alignment, also called radial or track alignment. The recording head should line up directly over the centerlines of the disk tracks. PC disks have 40 circular tracks located 21/1000 of an inch (21 milli-

inches) apart. The drive should write data right down the middle of each track, and at the very least, read anything that's within about 7 milli-inches of being on center.

Disk clamping or centering. If the disk isn't held in place, the read/write head won't be centered over the proper tracks.

Hysteresis, or positioner backlash. When the read/write head jumps from track to track, it may over- or undershoot the intended track by a hair.

Write/read. A series of random characters are written to disk, then read back. Some test for 10 seconds, others will run all night if you let them.

Erase crosstalk or crosstalk. Little erase heads on either side of the bigger read/write head create the electronic equivalent of a demilitarized zone between tracks. Sometimes, the erase heads inadvertently pick up a stray signal and confuse the drive.

Noise tolerance. Especially

at the innermost tracks, the read/write head may have trouble reading data accurately. Cleaning the head usually solves the problem.

Brief Descriptions

Diagnostic products include Verbatim's *Datalife Disk Drive Analyzer* (\$39.95), which runs four tests in about 2 minutes. While underway, it displays cartoonlike representations of the functions under test. Its results are rated good, fair, or poor. You can run tests one at a time with manual retries, or you can let an auto-sequence step through all four. It supplies instructions on a stiff card.

The Dymek *RID*, or *Recording Interchange Diagnostic* (\$34.95), runs seven tests in 25 seconds and reports them back as pass/fail. Instructions are on a single card, and a 16-page booklet explains the tests. You can even get a printout of the results.

Both the Verbatim and Dymek diagnostics programs read and write their test patterns on their own disks, rather than on scratch disks.

Award Software's *Cross-Chex* (\$99 and until recently called *PC-Care*) and SuperSoft's *Diagnostics II* (\$125) also test RAM, keyboard, monitor, and printer. *Diagnostics II* has one version for the IBM PC and compatibles, and a generic version for other MS-DOS PCs.

The *Cross-Chex* manual is (continued on next page)

Diagnostics Disks For Your PC

Datalife Disk Drive Analyzer

Verbatim
323 Soquel Way
Sunnyvale, CA 94086
(800) 538-1793,
(408) 245-4400
List Price: \$39.95
Requires: 64K RAM, one disk drive.

Interrogator

Dysan Corp.
Box 58053
5201 Patrick Henry Dr.
Santa Clara, CA 95050
(800) 551-9000,
(408) 988-3472
List Price: \$139
Requires: 64K RAM, one disk drive.

Recording Interchange Diagnostic (RID)

Dymek Corp.
1851 Zanker Rd.
San Jose, CA 95112
(408) 947-8700
List Price: \$34.95
Requires: 64K RAM, one disk drive, DOS.

Cross-Chex

(formerly *PC-Care*)
Award Software, Inc.
236 N. Santa Cruz Ave.
Los Gatos, CA 95030
(408) 395-2773
List Price: \$99
Requires: 64K RAM, one disk drive, DOS 2.x.

Diagnostics II

SuperSoft, Inc.
Box 1628
Champagne, IL 61820
(217) 359-2112
List Price: \$125
Requires: 64K RAM, one disk drive, DOS.

Copy II PC

Central Point Software
9700 SW Capitol Hwy., # 100
Portland, OR 97219
(503) 244-5782
List Price: \$39.95
Requires: 64K RAM, one disk drive, DOS.



Diagnostics (continued)

cheaply printed and hard on the eyes. Before running the disk drive tests, you're prompted to use a head-cleaning disk, even if you don't want to. Other than

for a head improperly angled over a track, and a continuous read/write test for checking out new or recently repaired drives.

Interrogator is the disk analyzer to have if you'll be doing

tion as an analyzer, although that's not its role in life. Central Point Software's *Copy II PC* program, meant for backing up your copy-protected disks, includes a drive-speed utility. If

what they claimed, all five were run on a PC that was in perfect shape except for one drive slipping out of alignment. All but one program spotted the problem, but none agreed on the se-

FLOPPY DISK TESTS								OTHER TESTS						
Program	Disk speed	Alignment	Clamping	Read/Write	Noise	Cross-talk	Back-Lash	Hard disk	RAM	CPU	Monitor	Keyboard	Printer	Price
Datalife Disk														
Drive Analyzer	P/OK/F	P/OK/F	P/OK/F	P/F										\$ 39.85
RID	P/F	P/F	P/F	P/F	P/F	P/F	P/F							\$ 34.95
Interrogator	Exact	Exact	Exact	Exact			Exact							\$139.00
Diagnostics II				Exact				Yes	Yes	Yes	Yes	Yes	Yes	\$125.00
Cross-Chex	Exact	P/F	P/F	P/F		P/F		Yes	Yes		Yes	Yes	Yes	\$ 99.00
Copy II PC	Exact													\$ 39.95

Note: Programs report floppy disk results as pass/fail [P/F], pass/acceptable/fail [P/OK/F], or give exact readings [Exact].

The chart above shows testing capabilities of various diagnostics programs mentioned in this article.

that, the program runs nicely. The hard disk test doesn't affect data on the disk.

Technical Trivia

The 50-page *Diagnostics II* manual is awash in technical trivia, partly because it's possible for a user to set test parameters in hexadecimal. The *Diagnostics II* floppy drive test is meager and fails to give a clear on-screen warning that the disk read/write test destroys any data in the drive being tested. Its memory and printer tests are fairly sophisticated, though one version of the memory test takes 13 hours to test 16K of RAM. Fortunately, there's a quick, one-minute version, too. The hard disk test overwrites data on the disk.

Diagnostics II is the only disk that can be duplicated. The others have specially created, out-of-alignment tracks to test alignment, clamping, and backlash. Even if you could make a copy that ran, the results wouldn't be valid.

Dysan's *Interrogator* (\$139), which tests floppy drives only, is a gem. All readouts are in exact numbers. The illustrated manual is technical but clear if you read through it twice, and the overall package has the solid, silky feel often associated with expensive, well-machined products from Germany. It has one test the others lack—azimuth alignment—to check

service work, although *Diagnostics II* can also be used. However, *Interrogator* is probably overkill for most people. You just don't need the level of sophistication Dysan offers.

One other program can func-

tion as an analyzer, although that's not its role in life. Central Point Software's *Copy II PC* program, meant for backing up your copy-protected disks, includes a drive-speed utility. If

you have the program, you should run the utility every once in a while. Passing the speed test doesn't mean you have a healthy drive, but it's better than nothing.

To see if the programs did

what they claimed, all five were run on a PC that was in perfect shape except for one drive slipping out of alignment. All but one program spotted the problem, but none agreed on the se-

To Err Is Human

Software companies have such similar names that you can't tell the players without a scorecard. Take the case of Human Engineered Software and Human Edge Software, two Silicon Valley companies with the same initials (HES) and even the same first and last names.

Despite this similarity, the two companies make quiet different software. In Brisbane, California, Human Engineered Software, best known by its HES initials, has been a leading maker of software for Commodore's home computers. From its Palo Alto headquarters, Human Edge Software, however, has aimed its line of expert-system software (including *Sales Edge* and *Communication Edge*) mainly at the IBM PC and Apple markets.

Confusion came to a head this fall when troubled Human Engineered Software filed for Chapter 11 protection and was acquired soon afterwards by Avant-Garde of Eugene, Oregon. At the same time, Human Edge Software was having a successful first year of sales and was in the midst of a round of financing for further growth.

Now, to its horror, Human Edge Software learned just how much the computing public was confused by these similar names. Friends and reporters called up to ask if they were going bankrupt and some retailers refused to speak to Human Edge's sales people, not wanting to deal with an unreliable, bankrupt manufacturer.

The worst case was a classic pulic relations nightmare. In a television appearance by Human Edge's president, James Johnson, an analyst from Dataquest started grilling him about his company's supposed bankruptcy...on the air! If industry experts can't keep these names straight, who can?

—James Langdell

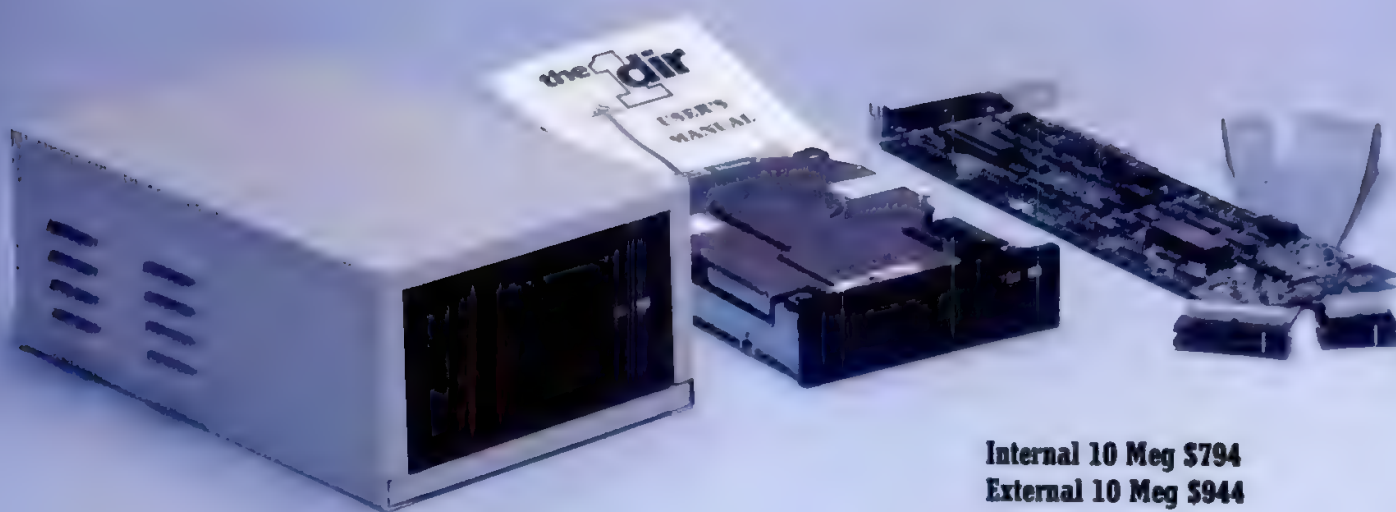
Buyer's Guide

Which one should you buy? Dymek's *RID* has the most tests for the fewest bucks. The Verbatim tester is fun to watch running and has that third, marginal-pass parameter. If you're into technical excess and have the money, go with the Dysan *Interrogator*.

If you want more tests than just the ones for floppies, *Cross-Chex* has the most useful hard disk test and its manual has less techno-babble than the *Diagnostics II* manual does. Both can spot bad RAM chips, among their other uses.

If one of the diagnostic programs does find a floppy drive problem, transfer the suspect data before making repairs. On a two-drive PC, read from the sick drive and write a copy to the healthier drive. ■

The Hard Disk With The Software Shell

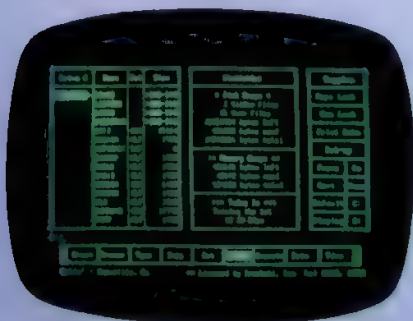


Internal 10 Meg \$794
External 10 Meg \$944

Why pay more for 10 or 20 Meg drives than you have to? Our 10 Meg internal hard disk subsystem is priced at \$794, with the 20 Meg model going for \$1088. Our external 10 Meg goes for \$944, 20 Meg for \$1238.

Our drives are fully compatible with any IBM PC or PC-compatible with 64K RAM and PC-DOS 2.0 or later.* Qubie' drives boot directly from the hard disk. You can power up the PC and load the system directly, without using any floppy disks. No software patches or drivers to install.

Using the same amount of power as a floppy drive, the Qubie' hard disk uses less energy than other aftermarket drives.



The drives come complete with 1dir software. 1dir's commands are in English, eliminating the need to

type in DOS commands, and are all selected by using cursor control keys. 1dir even explains commands with HELP screens that give you on-line advice when you need it.

Qubie' drives are made of special plated recording media. They withstand the vibration and movement that has damaged hard disks in the past. In fact, Qubie' drives have been selected by several computer makers for use in their portable computers.

Good service starts with answering your questions before and after you buy. It continues with same or next day shipment of your order. Since we only sell a few selected products, we have the information and inventory to help you fast.

We perform repairs in our own service department within 48 hours, should you ever need service during the one year warranty period.

Our price is the whole price. All prices include UPS surface charges and insurance. In a hurry? Two day UPS air service is just \$12.

Corporations, dealers and institutions, call for volume purchase price information.

*Call for information.

No Risk Guarantee

If you are not completely satisfied with your purchase, you may return it within 30 days for a full refund, including the cost to send it back. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like.

Order Today, Shipped Tomorrow!

For fastest delivery, send cashiers check, money order, or order by credit card. Personal checks, allow 18 days to clear. California residents, add 6% sales tax. Hours: Mon-Fri 8:00 a.m.-6:00 p.m. PST Sat. 9:00 a.m.-1:00 p.m. PST

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
 Camarillo, CA 93010

London (01) 223-4569
 Paris (01) 321-5316
 Sydney (02) 578-3322

© Qubie' 1984

CIRCLE 383 ON READER SERVICE CARD

PRODUCT REVIEW

Personnel Improvement?

A management training disk misses a rung on the ladder to success.

BY RICHARD POWELL

People Management

CBS Software
1 Fawcett Pl.
Greenwich, CT 06830
(203) 622-2525

List Price: \$79.95

Requires: 128K RAM, one disk drive.

CBS Software's Managing For Success series is a computer-assisted management training series designed to help you understand what makes an effective manager and assist you in developing your own potential as a manager. It is geared toward helping you manage more effectively, whether you work in a for-profit, nonprofit, or volunteer organization. The questionnaires used in this series were developed over 10 years by the Institute For Management Improvement and administered in small- and middle-size businesses as well as in Fortune 500 companies.

People Management, a new entry in the series, is composed of four disks, each containing one topic or unit. Each unit has

its own sub-units, which make up a Thoughtree. This is nothing more than an annoying way of graphically displaying what is essentially just a menu.

The first *People Management* disk is devoted to Leadership and its 3 sub-units: What is Leadership?, Understanding Influence and Authority, and Using Leadership Strategies. The other disks' topics are Team Building, Motivation, and Communication. The Program Guide provides you with operating instructions, worksheets, and references for further study.

Each unit and sub-unit pre-

sents common management problem situations. They create a scenario, offer a small amount of background information, and ask you to choose a solution from the options on the screen. If you pick the right one, the program congratulates you and tells you why it was correct. If you are wrong, it tells you why and asks you to go back and try again. Confronting the situations on each disk is supposed to teach you about effective personnel management and sharpen whatever skills you already have.

Sound impressive? Not for

long. The program gives you so little background information that instead of making a rational decision, you find yourself engaged in a guessing game with your computer. Worse, *People Management* has been programmed so poorly that it takes an exorbitant amount of time to run.

Scenarios show up on the screen line-by-line instead of as an entire page. When you make an incorrect choice and are asked to go back and make another, you are given the same three options without any indication of what your original incorrect choice was. Because it takes so long to run through the process, you may have already forgotten what it was.

As your frustration mounts, the natural inclination is to try to speed things up. Don't bother. With programming right out of Bob and Ray's Incredible Slow-Talking Man routine, even the message, "press spacebar to continue" only works when the red light goes off, up to 3 seconds after the message appears on your screen.

You can wind up spending 2 hours running the program for just a few minutes' worth of management training. This eliminates any possible benefit of computerizing the instruction of a subject such as this. If you want to learn about people management, go out and buy a good book. ■

How to Make Your Own PC News

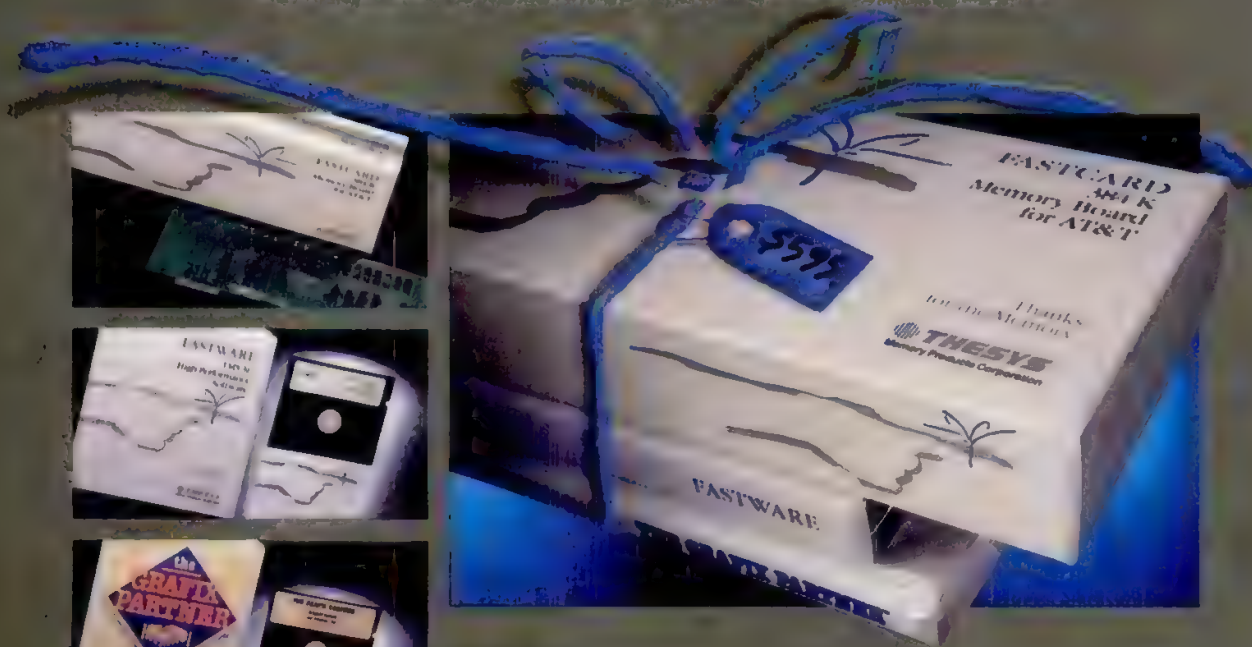
If you know any news, gossip, jokes, or unusual computer tales that make you say, "Gosh! That ought to be in PC News," please tell us. We'll pay up to \$50 for each submission we use. You must include your name, address, and phone number—and a social security number so we can pay you. We will, if you wish, preserve your anonymity. All submissions become the property of *PC Magazine*.

Please send your stories and tips to PC News, *PC Magazine*, One Park Ave., New York, NY 10016, or through your computer to Source BBB343 or MCI Mail 157-9301.

Calendar of Events

DATE	EVENT	COMMENT	LOCATION	CONTACT
February 16-20	The International Software Update II	Discussions of international domestic software standards, marketing strategies, and more.	The Waiohai Resort Kauai, HI	The International Microcomputer Industries Association 21 Tamal Vista Blvd., #175 Corte Madera, CA 94925 (800) 732-2300 (415) 924-1194 (in CA)
February 20-25	INFO/CENTRAL	Sessions on telecommunications planning and software for data security.	O'Hare Exposition Center Chicago, IL	Banner & Greif, Ltd. 110 E. 42 St. New York, NY 10017 (212) 687-7730
March 4-7	Interface '85	System and services for large-scale corporate, government, and institutional users.	Georgia World Congress Atlanta, GA	The Interface Group 300 First Ave. Needham, MA 02194 (617) 449-6600

Buy our 384K board for your AT&T PC. You'll thank us a bundle.



Buy our THESYS FASTCARD™ Memory board for AT&T* at the regular price of \$595 and get the \$149 Grafix Partner and our \$60.00 FASTWARE™ 3.0 High Performance software absolutely free.

FASTCARD

Our FASTCARD super memory board uses patented 256K DRAM chip technology to expand memory to 640K. No software or hardware alterations are required.

FASTWARE

Our 3.0 software automatically increases the speed of disk access. Provides RAM cache, print buffering and cuts hard disk-to-floppy backup time in half. No hardware or software alterations required.

GRAFIX PARTNER

Best-selling Grafix Partner color software lets you customize Lotus

and other graphic images to your needs. Works as standalone software or co-resides with other

SOFTWARE

Now that's a bundle. Offer good till February 28, 1985. For information or credit card orders, call toll-free 1-800-621-8282. Or write THESYS, 7345 East Acoma Drive, Scottsdale, Arizona 85260, 1-602-991-7356. Dealer inquiries invited. Shipping costs extra.

*For use with AT&T 6300 PC only.



Thanks for the Memory

THESYS
Memory Products Corporation

People in the News: Dan Bricklin

VisiCalc's creator has emerged from his legal battles with high hopes for the future.

BY VIRGINIA DUDEK

WELLESLEY, Mass.—“We started this whole thing,” says Dan Bricklin, speaking about the use of personal computers in business. “I never used to say that till other people said it,” he adds by way of apology, “but our industry may not have been where it is if we had not done the electronic spreadsheet.”

A man given to few pretenses, Bricklin's office attire consists primarily of jeans and a plaid shirt. But, perhaps, a prizefighter's robe would be more appropriate. In the past year, he has seen his program, *VisiCalc*, dethroned as the business software champion on the best-seller lists. And, he has just emerged from a lengthy, bitter court battle with VisiCorp, the corporation that was once his strongest ally in the industry.

Bricklin is the chairman of Software Arts, Incorporated. In 1979, he and cofounder Bob Frankston created *VisiCalc*, the first electronic spreadsheet program, and are acknowledged as being principals in that early cadre of individuals who spurred the fledgling personal computer industry and ran smack up against the hard realities of business life in a multimillion-dollar industry.

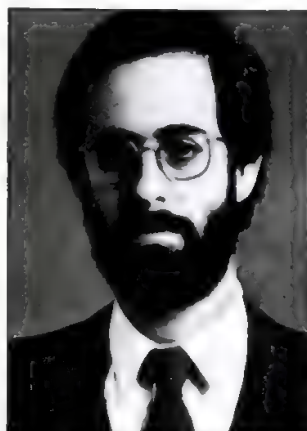
Hindsight

Bricklin and Frankston initially contracted with Personal Software to publish and distribute *VisiCalc*. Then, *VisiCalc*'s sales became so impressive and its reputation grew so wide that Personal Software's name evolved into VisiCorp, with most of its products' names beginning with “Visi.”

“They had other products after *VisiCalc*,” says Bricklin, “but they didn't name the company after those; they renamed their products Visi this and Visi that. So, it was obviously very important to them.”

Business disputes between

the two corporations eventually led to lawsuits and countersuits. The companies duked it out for 9 months until they finally settled out of court last fall, with Software Arts regaining the rights to *VisiCalc*. Bricklin still shows an edge of resentment



when he talks of VisiCorp and the way he believes the company treated him and Frankston.

He says VisiCorp presented a public image of them that seemed to be aimed at keeping the two men in the broom closet instead of in the limelight. “People got the image that Software Arts was just Bob and me in an attic, sitting around collecting royalty checks, which was not true. Because they (VisiCorp) were helping that image, we lost something that would be of any value to our company.”

On reflection, Bricklin thinks he's been able to identify some of the pitfalls that led to the problems between his company and VisiCorp. “If you have two companies that are very dependent on each other, you should see about getting closer together. Communication is a large portion of it,” he says.

“People are trying to generalize a lot of things from the lawsuit that maybe are not appropriate,” comments Bricklin on the tug-of-war between

VisiCorp and Software Arts. He sees the dispute as a conflict between developer Software Arts, whose products he says were responsible for 60 percent of VisiCorp's revenue, and VisiCorp, which wanted to market only “hit” products, but never actually found another product as successful as *VisiCalc*.

In the days before the lawsuits, Bricklin recalls dealing with VisiCorp over distribution of *VisiCalc* monies. “Most of the other VisiCorp authors were bought out by VisiCorp,” he says. “I thought we almost had a deal once. But, the negotiators had no bargaining power, and the board would shoot down the proposals. It was a lot of money for them to pay. So, we said we'd buy them out, but they didn't want that. In fact, they sued us a few days after we proposed it.”

The legal proceedings came to an end 9 months later, but, in the meantime, Software Arts had seen its product drop from the top of the best-seller list and had only moderate success with its release of two new products, *TK!Solver*, an equation processor for personal computers, and *Spotlight*, a desktop manager.

Not Worried

However, Bricklin isn't worried by the Lotuses and Microsofts of the world. “We were the first spreadsheet, period,” he says. “We lasted a pretty long time, considering everyone and their brother went after us. Even in '82, we sold over 200,000 copies of *VisiCalc*, officially more than Lotus sold. In '83, we were still number one, and there was very little advertising for *VisiCalc* that wasn't tied to *VisiOn*. In 1984, there was almost no advertising for *VisiCalc* except what we did, which made it difficult to stay in the top position. You would expect

a product with a lot of competition to have problems.

“In a given category, one company frequently dominates for a long time, until something happens that will change it. It's often a new piece of hardware that causes things to change. Lotus never knocked us out with the Apple (*VisiCalc* was originally designed for the Apple). We had a great piece of code on the Apple. Our competitors tell us we would still be number one on that machine. On Atari we do OK. Basically, we still do OK on those machines that we're good on.”

Bricklin's optimism is unbounded. “In terms of coming back, there are many times in the future we will come back. I'm not worried about that. In certain areas, Lotus is just as vulnerable. It's just that with the machine they're on they have a very good cash cow. VisiCorp looked invulnerable, because it had all those different products, but it went down real fast.”

Bricklin and Software Arts have not hesitated to move on with new products, but the lawsuit has carried over some name identification problems. “People think I'm the chairman of VisiCorp,” he says. “More likely, they think everybody works for a company called *VisiCalc*. People think when they're dealing with VisiCorp they're dealing with us, which costs us money in not knowing about new opportunities.”

Bricklin knows the identity of his company and his products and does not hesitate to spell out where he sees himself. “We do innovative products,” he says. “And we stay with them. We have a lot to contribute, probably more than most other companies in the industry. Were we not around, I think the industry would be worse off. There are not that many other companies you can say that about.” ■

HOW TO BUY SOFTWARE WHEN ALL THE ADS LOOK THE SAME.

We know it's hard to choose a software house. All the ads say the same thing—"Lowest prices," "fastest delivery," "best support," "biggest inventory."

Trouble is, although the claims are the same, the companies are very different. Which is why we want you to know some important facts about us:

1. 800-SOFTWARE is one of the oldest and most reputable firms in the industry. Our customers include IBM, GE, Hewlett-Packard, Xerox, AT&T, and thousands of other satisfied buyers.

2. Our National Accounts Program offers volume discounts and valuable services to large software users. We offer *incredibly* low prices on large bids!

3. We have a giant, \$1,000,000 inventory. Which means we can offer next-day delivery if needed.

4. With every product you get friendly, expert technical support. Have a question? You'll be glad you bought from 800-SOFTWARE!

5. We'll match our competitors' prices on most products. We *never* cut service.

6. We never charge extra for credit card purchases, nor do we process for payment until the product is shipped. (Our competitors don't make this claim!)

7. You'll automatically receive our Technical Support Newsletter—a great way to stay up-to-date.

8. We are members of the Better Business Bureau and the Direct Marketing Association.

9. We want your business. *And* your repeat business. Which is why we work so hard to keep you happy. Give us a call and let us *prove* it!

CHECK OUT ALL OUR INCREDIBLE PRICES:

Lotus 1-2-3 \$309	dBase II/III \$299/\$379	Framework \$379	WordStar 2000/2000 Plus \$269/\$329
Lotus Symphony \$439	Cresstalk \$105	SuperCalc 3 \$209	Hayes Smartmodems 1200/1200B \$489/\$409
<div> <div> SOFTWARE ASHTON-TATE™ dBase III/III \$299/\$379 Framework \$379 Friday! \$219 DIGITAL RESEARCH™ CALL FOX & GELLER™ CALL IMSI™ 4-Point Graphics \$ 99 PC Paintbrush \$ 99 LIFETREE™ Volkswriter Deluxe \$179 LOTUS™ 1-2-3 \$309 Symphony \$439 MICROPRO™ WordStar 2000/2000 Plus \$269/\$329 WordStar Pro Package/PP Plus \$259/\$359 InfoStar CALL ChartStar \$239 </div> <div> TelMerge \$ 99 All Other Products CALL MICROIM™ RBase 4000 \$289 MICROSOFT® Multiplan \$149 Word w/Mouse \$299 Fortran \$269 All Other Products CALL MICROSTUF™ Cresstalk \$105 MULTIMATE™ \$299 ROSESOFT™ Pro Key \$ 99 SOFTWARE PUBLISHERS™ PFS File/Graph/Write \$ 84 PFS Report \$ 75 BORCIMBUS™ SuperCalc 2/3 \$159/\$209 EasyWriter II System \$185 IUS Easy Business Accounting \$289/mod. All Other Products CALL </div> <div> HARDWARE, ETC. AMDEK™ Monitors CALL AST™ Products CALL ATI™ & COEX™ TRAINING CALL EPSON™ PRINTERS NEW LOW PRICES! HAYES™ Smartmodems 1200/1200B \$489/\$409 HENCULES™ Color Card \$199 Graphic Card \$329 IBM® Computers and Other Products NEW LOW PRICES! MAXELL™ & MEMOREX™ DISKETTES CALL NORTON UTILITIES™ \$ 59 OKIDATA™ PRINTERS NEW LOW PRICES! PRINCETON GRAPHICS™ MONITORS CALL QUADRAM™ CALL WESTERN UNION EASY LINK® FREE </div> </div>			

WE ALSO CARRY HUNDREDS OF OTHER PRODUCTS!



800-SOFTWARE, INC.
940 Dwight Way
Berkeley, CA 94710

800-SOFTWARE

To order call toll-free:

800-227-4587 OR 415-644-3611

CIRCLE 230 ON READER SERVICE CARD

- ☐ Dealer inquiries welcome.
- ☐ Quantity discounts available through our National Accounts Program.
- ☐ Purchase orders accepted. Please call us in advance.
- ☐ Call for shipping charges. Overnight delivery available.
- ☐ We do not add surcharge for credit card purchases.
- ☐ Prices may change. Above prices are for IBM-PC and compatibles.
- ☐ International orders welcome: TELEX #751743 800 SOFTWARE UD.
- ☐ Compuserve Key Word "GO-EH."



DO YOU IBM TAKE APPLE?

APPLE TURNOVER™

A "wireless file transfer" package for the IBM PC® to Apple II and back, and back again. Apple turnover is a firmware board which fits into any slot in the IBM PC® or compatible, and software running under MS-DOS®. No modems, no serial links, no hassles, no problems. APPLE TURNOVER™ will format Apple CP/M® and Apple DOS 3.3 disks. Leave your IBM and Apple computers where they are. Simply bring your Apple disk to work and transfer your file to a PC-DOS disk. Allows for minor modifications to text and data files. It's a simple, inexpensive, fast high performance alternative to complicated serial links and modems.

XENO-COPY PLUS™

A "wireless file transfer" software program for your IBM PC and most PC look-alikes. XENO-COPY PLUS™ copies files between IBM-PC® and many CP/M® and foreign MS-DOS® disk formats. An uncomplicated and inexpensive way to transfer text and data files. XENO-COPY PLUS™ allows you to format, copy from and write to nearly eighty different formats. Also, allows for minor modifications to text and data files. XENO-COPY PLUS™ can be upgraded to XENO-DISK™ for the price difference.

XENO-DISK™

The high performance model of XENO-COPY PLUS™. XENO-DISK™ formats, writes to, and copies from over 100 different disk formats including 40 and 80 track 5¼" disks. XENO-DISK™ supports the use of several 8" disk formats. XENO-DISK™ contains a powerful table driven text translator, "Text-Tran." For low volume disk production, XENO-DISK™ includes a track-by-track disk duplicator (which is faster than file by file duplication). Gives you the option to input disk format parameters which allows you to utilize uncommon disk formats. XENO-DISK™ includes a back-up disk and one free update.

80Mate™

A CP/M® 80 emulator for MS-DOS® computers. After programs have been transferred onto PC/MS DOS® disks with XENO-COPY PLUS™, XENO-DISK™, or APPLE TURNOVER™, 80Mate™ lets you simulate most CP/M® 80 systems on your MS-DOS® computer. Includes all internal CP/M® commands and many available functions. 80Mate™ includes a terminal emulator for 7 predefined terminals including APPLE CP/M®! You can also input parameters for other terminals that need to be emulated, without additional Apple hardware.

APPLE TURNOVER, XENO-COPY PLUS, XENO-DISK, 80Mate are registered trademarks of Vertex Systems, Incorporated.
IBM PC is a registered trademark of International Business Machines Corporation.
APPLE is a registered trademark of Microsoft Corporation.
DOS is a registered trademark of Microsoft Corporation.
CP/M is a registered trademark of Digital Research Incorporated.

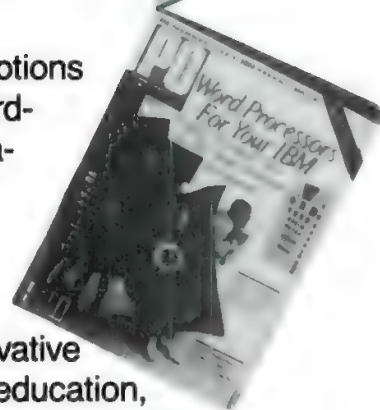
**See your dealer or
call for information.
(213) 938-0857**

Vertex
systems, inc.
Innovation in microcomputer products
6022 W. Pico Blvd., Los Angeles, CA 90035

DISCOVER THE BEST WAYS TO EXPAND YOUR PC FOR AS LITTLE AS 84¢ EVERY ISSUE

Only *PC* presents all the options and new innovations in hardware, software and applications. And now you can subscribe for only 84¢ an issue. You'll receive an information-packed issue every two weeks with innovative applications for business, education, finance and professional use *plus* reviews on the newest hardware, software and peripherals that make these applications come to life on your PC.

Subscribe to *PC* today for as little as 84¢ an issue and open up new options for your PC.



Y E S

Please enter my subscription to *PC* for:

- | | |
|--|--|
| <input type="checkbox"/> 24 issues
For only \$21.97
Less than 92¢ an issue | <input type="checkbox"/> 48 issues
For only \$39.97
Less than 84¢ an issue |
|--|--|

Mr./Mrs./Ms. _____ (please print full name) PC4S697

Company _____ Title _____

Address _____

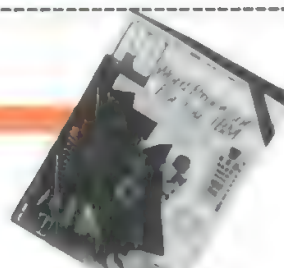
City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Add \$2 an issue for postage in Canada and all other foreign countries. Please allow 30 to 60 days for delivery of first issue. Single copy price \$2.95.



Y E S

Please enter my subscription to *PC* for:

- | | |
|--|--|
| <input type="checkbox"/> 24 issues
For only \$21.97
Less than 92¢ an issue | <input type="checkbox"/> 48 issues
For only \$39.97
Less than 84¢ an issue |
|--|--|

Mr./Mrs./Ms. _____ (please print full name) PC4S697

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Add \$2 an issue for postage in Canada and all other foreign countries. Please allow 30 to 60 days for delivery of first issue. Single copy price \$2.95.



FOR AS LITTLE AS 84¢ AN ISSUE YOU CAN EXPAND YOUR PC EVERY TWO WEEKS



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage Will Be Paid By Addressee



P.O. Box 2443
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage Will Be Paid By Addressee



P.O. Box 2443
Boulder, Colorado 80321

IN BUSINESS

IN EDUCATION

IN LAW

IN MEDICINE

IN FINANCE

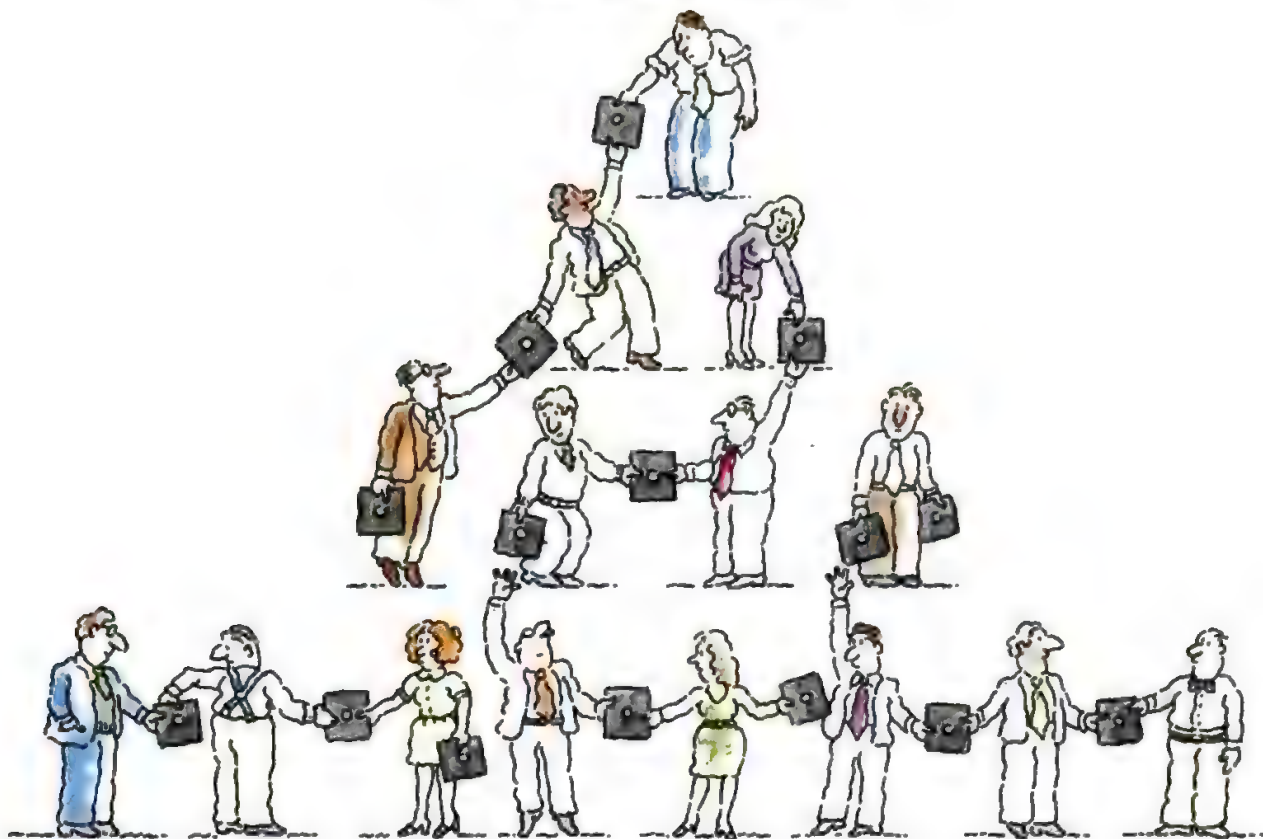
IN PROGRAMMING

IN WRITING

**ANY WAY
YOU USE
YOUR PC!**

Subscribe today to *PC*, The Independent Guide to IBM Personal Computers and open up new options for your PC!

THE END OF SOFTWARE FREEBIES.



Finally there's a foolproof way to protect software against unauthorized duplication. And the technology is all on the disk itself.

The new Prolok™ disk doesn't need add-on hardware. Instead each diskette is marked with a unique, physical "fingerprint." No two are alike. A precise description of the individual print is encoded magnetically. The fingerprint AND the description must match exactly before the software is decrypted and released to the system. No match, no access.

Its genius is its simplicity and familiarity. Prolok looks like an unprotected disk, loads like an unprotected disk, works like an unprotected disk. The user feels immediately at home and in command. It's as easy as A>PROLOK B: filename.

Backups are easily made via normal system utilities. However, to be read they must be accompanied in the system by the original Prolok disk.

Prolok puts the casual copier—and even the deliberate pirate—out of business. It barely

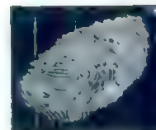
increases the price of your product, yet it makes sure your customers don't buy one program and copy ten.

Several command line slash (/) options are built into Prolok diskettes for customized security, depending on your needs.

Software can be loaded easily onto Prolok diskettes using any system from a PC to commercial mass duplication equipment.

Prolok is an engineering breakthrough of Vault Corporation, which has been successfully safeguarding software since the inception of security disk technology. Over 2000 businesses and organizations protect their valuable programs with Prolok.

Simply contact Vault Corporation at 2649 Townsgate Road, Suite 500, Westlake Village, CA 91361. Or phone us at 800-445-0193 (U.S.) or 800-821-8638 (California). And find out why software freebies are becoming a thing of the past.



PROLOK. SOFTWARE PROTECTION, RIGHT ON THE DISK.

Copyright © 1984 Vault Corporation. Prolok is a trademark of Vault Corporation

CIRCLE 508 ON READER SERVICE CARD

Micros. Mice.

When you can't stop by your local Micro Mart Store, call us direct.
ORDERS ONLY

1-800-241-8149

At Micro Mart, we've got our finger on the pulse of the microcomputer industry. And, from our retail stores to our telemarketing divisions, we're in touch with the very latest developments, the newest products and the cutting edge of expert advice.

When you need the right product at the right price, remember the sales, service and support our local store experts and national distribution center can give you.

So if you can't drop by your local Micro Mart Store, let us point you in the right direction. Ask for your best price and expert advice.

AT&T Personal Computer. Innovative hardware for a wide range of business applications.



128 K expandable to 640K, 2-360K, DS/DD Disk Drives, Monochrome Display, IBM Compatible. Special introductory price.

LEADING EDGE Color PC, 256K, 2-360K DS/DD Disk Drives, Amdek Color 600. \$1995
MINDSET Personal Computer, 256K, 2-360K DS/DD Disk Drives, W/Mindset Mouse. \$1795

Networking/Protocol Conversion

SNA & BISYNC 3780, 5251, 3274, 3278.
PC TURBO 186 by ORCHID, 80186 coprocessor board. \$829
IRMA/IRMA LINE Replaces 3278's w/PC's. \$899/\$1099
FORTEGRAPH for IRMA, upgrades IRMA to 3278 graphics capability.
IRMAPRINT Enhances IRMA graphics.
PCnet By ORCHID, complete line. Start @ \$299
BLUE LYNX 5251 Mod 12 & 3276 Emulators by TECHLAND.
SANTA CLARA PC Terminal.

Printers & Plotters

Thousands in stock.
HOUSTON INSTRUMENTS Plotters and Digitizers.

TOSHIBA P-1351 & 1340. \$1295/\$799

DATA PRODUCTS
PRISM 8050 Color, 132 col., 200 cps. \$1295

STAR MICRONICS
Complete line.

TEXAS INSTRUMENTS
855. \$729

NEC Pinwriters, P2 & P3, 180 cps.

DIABLO C-Series C-150. Color ink jet, IBM color compatible. \$985

Letter Quality

NEC Spinwriters 2050, 3550, 8850.

DIABLO 630/630ECS. \$1395/\$1795

C-ITOH Starwriter, (40 cps), Printmaster, (55 cps). \$950/\$1299

We carry a full range of form handling options.

Floppy Disk Drives

TANDON TM 100-2, DD/DS, 360K. \$185

1/2 HEIGHT DISK DRIVES From SHUGART, TEAC. PC, XT & AT compatible. \$119

Hard Discs

Micro Mart carries all the major brands.

If you don't see it—ask for it.

PEACHTREE PERIPHERALS

P-10, 20 & 50, auto boot, int. & ext. Start @ \$845

SYSGEN 10 & 20 Meg w/streamer tape. \$2395/\$2795

SYSGEN Image & Quickfile, streamer tape back-up for your IBM XT & AT.

BERNOULLI TECHNOLOGY Hard Disc Subsystems. \$2895

MAYNARD Complete line of hard disc subsystems.

EMERALD Hard disc drives w/back-up.

Chips

INTEL 8087 High speed coproc. \$169

64K RAMCHIPS. \$35/64K

256K RAMCHIPS.

Multifunction Boards

We have a complete line of multifunction bds. compatible with the Portable, AT, XT, & Jr.

SIX PAK 64-384K, multifunc.

MEGAPLUS 64-512K, max. 8 func.

I/O PLUS Ser., Clk., Splr., Ramdisk, opt. 2nd Ser., Par. & Game.

QUADRAM QUADBOARD, 64-384K, multifunc. \$259

TECMAR CAPTAIN, 64-384K, multifunc. \$249

TALLTREE J-RAM II, 0-512K, w/software.

TALLTREE J-RAM IIX, 0-512K, w/software. \$129

MICROLOG BABY BLUE II, 64-256K, Z80 coproc., + software.

ORCHID PC Blossom, 64-384K, w/opt. PCnet Piggy-Back. \$259

Dot Matrix
EPSON FX80/100.
EPSON RX80/100.
EPSON LQ1500.
EPSON JX80, color printer.
OKIDATA 92 & 93, ML84, (200 cps.), w/opt. IBM
PROMS, Pacemark 2410, (350 cps).

MAYNARD Complete line.

Graphic Cards

STB Graphics Plus II, color & mono, w/par. port & software. \$369

HERCULES Mono & color graphics cards support Lotus.

PLANTRONICS ColorPlus +, HiRes color bd., par. port w/software.

TECMAR Graphics Master, HiRes color & mono supports Lotus. \$459

QUADRAM QUADCOLOR I & II, color cards.

PARADISE SYSTEM Multi-display or Modular Graphics Cards, color & mono, par. port. Starting @ \$299

Software

Accounting
SORCIM/TUS Complete line including windows.
BPI ACCOUNTING Complete line.

Spreadsheets & Integrated Packages
ASHTON-TATE Framework. \$345

LOTUS Symphony and Lotus.

MICROSOFT MultiPlan, w/templates.

MDBS Knowledge Man.

SORCIM SuperCalc 3, Vers. 2.0.

SPI Open Access.

Enhancements & Utilities

SOFTCRAFT Fancy Font.

FOX & GELLER Complete line of enhancements for dBase II, III & Rbase 4000.

NORTON Utilities. \$65

ROSESOFT ProKey 3.0. \$89

Atlanta, New Orleans, Nashville, Miami, Tampa, Orlando

Advice. Price.

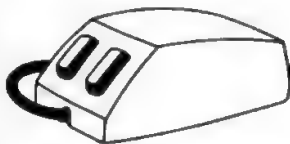
CENTRAL POINT SOFTWARE

Copy II PC. \$35
 ATI Training. \$55
 SOFTSTYLE Set FX + and Printworks. Printer control packages.
 SIDEWAYS Inverts printout. \$45
 BORLAND Sidekick. \$39
 LIVING VIDEO TEXT Think Tank.
 Compilers & Language Tools
 LATTICE C-Compilers. \$299
 MICROSOFT Complete line.
 WORDTECH The dBase compiler.
 DIGITAL RESEARCH Complete line.
 BORLAND Turbo Pascal, Turbo Toolbox and more. \$39/each

Graphics & CAD

Zsoft PC Paint Brush, mouse driven graphics. \$95
DECISION RESOURCES
 ChartMaster/Sign-Master pkgs.
 AUTODESK AutoCAD. Complete line. Start @ \$745
ENERTRONICS Energraphics, graphics & CAD package.
MICROPRO ChartStar.

Microsoft Mouse. Bus or serial mechanical mouse, comes with Mouse Menu software. Works with WORD and other popular software. \$159



PC Mouse, from Mouse Systems. Serial optical 3-button mouse with Pop-Up™ Menus and PC Paint software. Preconfigured for all the most popular software. \$159

MICROSOFT Chart.
DIGITAL RESEARCH Presentation Master.
Communications
MICROSTUF CROSSTALK XVI. \$99
HAYES SMARTCOM II.

Word Processors

MULTIMATE w/Spelling checker & tutorial. \$259
 SAMNA III, wd. processor.
 MICROSOFT Word, w/or w/out mouse.
 LIFETREE Volkswriter Deluxe.
 MICROPRO WordStar Pro Pack & Series2000. \$245
 SSI WordPerfect.
 WORDMARC Wordmarc.

Office & Project Planning

Call for our Tax and Tax Planning packages.
 HARVARD Harvard Project Manager. \$249
 IUS Easy SalesPro.
 MICROSOFT Project.
 Data Base Managers
 MICRORIM 4000 or 6000, Report Writer & Clout options.

GMS SYSTEMS Power-base.

WARNER SOFTWARE The desk organizer.
 ASHTON-TATE dBase II & III.
 MICROSTUF Infoscope.
Modems
 HAYES Smartmodem 300, 1200, & 1200B. \$199/\$469/\$329
 RIXON 1200-4800 BAUD sync. & async. models.
 ANCHOR AUTOMATION Signalman Mark XII. \$259
 VEN-TEL 1200 BAUD Half Card for the IBM Portable & XT.
 POPCOM Popcom, int. and ext. w/voice & data comm.

Miscellaneous Hardware & Accessories

DYSAN Diskettes, PC, XT & AT compatible.
 MICRO MART Diskettes DS/DD, 7 yr. war. \$19/10
 KEYTRONICS 5150 & 5151. Keyboards.
 IQ SHEET FEEDERS Sheet feeders.
 CURTIS Accessories.
 HAYES Mach II & Mach III joysticks.
 PENCEPT Penpad, software avail. \$775
TOUCHSTONE TECHNOLOGY
 Touchstone I. Ten key pad w/ cursor control.
 QUADRAM MICROFAZER, print buffer, 8-128K.
 TRIPPELITE Back up power supply 200-1000 watts, and ISOBAR surge protectors, 4 & 8 plug.
Monitors & CRT's
 PGS MAX 12, amber, 720h x 350v.
 PGS SR-12, 690h x 480v, w/dual scan cd.
 PGS HX-12, 690 Dot RGB.
 QUADRAM QUADCHROME, 690 Dot RGB. \$439
 AMDEK COLOR 300, 500, 600, 700, 710, 725, new complete line of HiRes RGB's w/new low prices.
 AMDEK 300A/300G, composite monitors. \$139/\$129
 AMDEK 310A, amber w/3 yr. war.
 WYSE Terminals, 100, 75, 50, entire line in stock.



Micro Mart has financing options available. Ask for a Micro Mart Blue Chip Credit Card application today.

Service & Repairs

*On-Site—We have hundreds of service locations nationally.
 *Depot—Our National Service Center is one of the fastest in the US.
 *We have—A wide variety of services available. Just call us.

© Copyright Micro Mart 1984.
 Technology Corporate Campus
 3159 Campus Drive
 Norcross, Georgia 30071

For information or the store location nearest you, call

(404) 449-8089



America's PC Specialist.

MICRO MART™

IBM is a registered trademark of International Business Machines Corporation. AT&T, Leading Edge, Mindset, Microsoft, Mouse Systems and their products, respectively, are trademarks of AT&T Information Systems, Leading Edge Products Inc., Mindset Corporation, Microsoft Corporation and Mouse Systems Corporation. All Prices are subject to change without notice.

Ft. Lauderdale, Louisville, Tyson's Corner, Rockville, Pittsburgh.

CIRCLE 478 ON READER SERVICE CARD

We Set the Standard in Prices!

For IBM PC Add-On Products.

Superior quality products and services at lowest prices.

Look at what we have to offer, before you buy any add-on products for your IBM PC.



QIC-01. 10 MB internal hard disk subsystem at ~~\$725~~ - *too low to quote!*

Our half-height 10 MB hard disk comes complete with controller, cables, Microscience drive and easy to follow instructions. It fits inside one of your floppy slots and draws same amount of current as a floppy. It is compatible with DOS 2.0, 2.1 and 3.0 without any patches. In fact, you can simply boot up from the hard disk. This is the same hard disk system you see advertised for hundreds of dollars more.

20 MB half-height internal hard disk **\$1095.**
20 MB drive for PC AT **\$895.**
40 MB full height with controller **\$1995.**

QIC-02. Streaming cassette tape back-up subsystem. **\$777.**

Now, you can back-up your 20 MB of hard disk in less than 10 minutes. This half-height cassette tape system fits inside your IBM PC and is very easy to install. It comes with a controller card, cables, cassette drive, one cassette tape and all necessary software. You can perform image back-up as well as file by file back-up and restore.

20-60 MB Cartridge tape subsystem **\$995.**

QIC-03. 300/1200 baud internal modem. **\$275.**

This auto dial/auto answer plug-in modem lets your PC talk to the world with reliable and easy operation. It is FCC certified. Bell 103/212 compatible as well as fully Hayes compatible. You can run all the popular communication programs as well as our superior QIC Com software program.

Our QIC-Com software program provides phone list management as well as powerful file transfer capabilities. You can even run any DOS programs such as WordStar concurrently without having to disconnect your line. Priced at \$45.00, it is an offer you don't want to miss.

QIC-04. Half-height floppy drive. **\$129.**

This half-height floppy is the quietest drive on the market. It draws the least amount of current and is compatible with your PC's floppy controller card. It's double sided, double density.

QIC-05. Five function card. **\$199.** (64 K RAM Set \$33.00).

Our five function card includes memory expansion from 0 to 384K, one serial port, one parallel port, one game port and one battery back-up clock calendar. RAM disk, print spooler and clock utilities are also included.

Expansion box with 10 MB hard disk **\$1495.**
Expansion box with 20 MB hard disk **\$1995.**

One Year Guarantee

No Risk. All our products are guaranteed for one year. And remember, if for any reason, you are not completely satisfied within 30 days, you can return it for a full refund. Check out our competition and find out which is best. We know better.

**CALL US TODAY AT
408-942-8086**

QIC RESEARCH
INCORPORATED
528 Valley Way
Milpitas, CA 95035

Tektronix 40XX Terminal Emulation

**EMU-TEK™ IS NOW AVAILABLE FOR
IBM PC, XT, AND MOST COMPATIBLES**

- Access powerful mainframe graphics using:
 - PLOT 10 (trademark of TEKTRONIX, Inc.)
 - DISSPLA (registered trademark of ISSCO)
 - SAS/GRAPH (trademark of SAS INSTITUTE, Inc.)
 - DARC (available from QUESTEL, Inc.)
 - and most similar packages and services.
- Upgrade from dim storage tubes to bright raster scan technology, with complete software compatibility.
- Increase versatility with options such as:
 - High resolution board support (HERCULES, etc.)
 - Local pen-plotter support (HP, AMDEK, etc.)
 - Hard copy on EPSON or IBM matrix printer
 - LIGHT PEN for graphic input
 - Advanced communications program features
 - Other terminal emulations, including:
 - VT100 (trademark Digital Equipment Corp.)
 - ADM3 (trademark Lear Siegler, Inc.)
 - RETRO-GRAPHICS (trademark Digital Engineering, Inc.)

• **\$395.00 PLUS OPTIONS**

• **30 DAY NO-RISK TRIAL PRIVILEGE.**

Call or write us, or see your participating dealer.



FTG
DATA SYSTEMS

10801 Dale St./P.O. Box 615
Stanton, CA 90680
(714) 995-3900

THE LIGHT PEN FOR YOUR PC IS NOW EVEN BETTER!

- New photo-optical push-tip switch for super reliability.
- **30 DAY NO-RISK TRIAL PRIVILEGE**, and **TWO** year limited warranty.
- Ideal keyboard alternative for INTERACTIVE GRAPHICS, MENU SELECTION, EDUCATIONAL PROGRAMS, and just plain fun.
- Compatible with a growing library of software:
 - PC-DRAW (trademark of MICROGRAFX)
 - MICRO-CAD (trademark of COMPUTER AIDED DESIGN)
 - SARGON 3.0 (trademark of HAYDEN PUBLISHING)
 - and much much more. (Complete list on request).
- Very high performance and reliability for just \$195.00. (Optional three diskette software package is just \$39.00)
- Ultra-deluxe version soon available (\$295.00).
- Got another pen?? Ask about our trade-in special.



FTG
DATA SYSTEMS

10801 Dale St./P.O. Box 615
Stanton, CA 90680
(714) 995-3900

CIRCLE 250 ON READER SERVICE CARD

IBM Compatible (OR) WILL YOU PAY TOO MUCH?

Ask About Our
**"30 DAYS
Buy-Back-Policy"**

MODEL 2000 768K

**"MANUFACTURER'S WARRANTY
NATIONWIDE"**

MODEL 1200 640K

**IBM
COMPATIBLE**

1 DRIVE PLUS 10 MEG

1 or 2 DRIVES PLUS 10 MEG

**HARDDRIVE
BUILT-IN**

IBM PC COMPATIBLE

**SAVE SALES TAX*
PLUS DISCOUNT**

*TEXAS RESIDENTS ADD ONLY 4 1/8%

**SERVICE AND
WARRANTY NATIONWIDE**

FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)

377 Plaza • GRANBURY • NR FORT WORTH, TEXAS 76048

CALL FREE NUMBER: 1-800-433-S-A-V-E

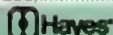
Monday thru Friday — 9:00 a.m. to 5:00 p.m. Texas Time
(Order Inquiries/Customer Service &) IN TEXAS: 817-573-4111

TM INTERNATIONAL BUSINESS MACHINES INC

It all adds up...

MODEMS

ANCHOR	
Volkmodem	\$59 99
Mark VI	\$189 00
Mark XII (12 Baud)	\$259 00



Smartmodem 300	\$199 00
Smartmodem 1200B	\$399 00
Smartmodem 1800	\$489 00
Smartmodem 2400	\$699 00
SmartCom II	\$89 99
Chronograph	\$199 00



J-Cat	\$99 99
Smart Cat Plus	\$339 00
Smart Cat 103	\$179 00
Smart Cat 103/212	\$399 00

MONITORS



300 Green	\$129 00
300 Amber	\$149 00
310 Amber IBM Plug	\$169 00
Color 300/Audio	\$259 00
Color 500 Composite/RGB/VCR	\$389 00
Color 600 Hi-Res (640x240)	\$439 00
Color 700 Hi-Res (720x240)	\$499 00
Color 710 Long Phosphor	\$579 00



1201 (12" Hi-Res Green)	\$88 99
9191U Color	\$229 00
9191 Color Plus	\$229 00



JB 1201 Green	\$139 00
JB 1208 Amber	\$149 00
JC 1215 Color	\$249 00
JC 1216 RGB	\$379 00

PRINCETON GRAPHICS

Max-12 Mono	\$199 00
HX 12 RGB	\$489 00
SR-12 RGB	\$629 00

QUADRAM

8400 Quadchrome 12"	\$489 00
8410 Quadchrome II 14"	\$479 00
8420 Amberchrome 12"	\$199 00



116 Green Mono	\$139 00
116 Amber Mono	\$149 00
121 IBM Green TTL	\$149 00
122 IBM Amber TTL	\$159 00
210 RGB/Composite	\$249 00
420 Hi-Res RGB	\$469 00



ZVM 122 Amber	\$89 99
ZVM 123 Green	\$84 99
ZVM 124 IBM Amber	\$149 00
ZVM 131 Color	\$309 00
ZVM 133 RGB	\$429 00
ZVM 138 RGB/Composite	\$459 00
ZVM 136 RGB	\$629 00

DISK DRIVES



5 1/4" 320K TM 100-2	\$169 00
----------------------	----------



5 to 45MB Hard Drives	\$1299 00
-----------------------	-----------

PRINTERS



BX-80 Dot Matrix	\$239 00
BX-100 Dot Matrix	\$249 00
401 Letter Quality	\$589 00



Prowriter 7800	\$289 00
Prowriter 8610P	\$339 00
Son of Starwriter A10P	\$479 00
Starwriter F10-40P	\$949 00
Printmaster F10-55P	\$1099 00



Comwriter II Letter Quality	\$449 00
-----------------------------	----------

DAISYWRITER

2000	\$949 00
------	----------



56	\$1099 00
620 Letter Quality	\$749 00
630-API Letter Quality	\$1649 00
630-ECS	\$1779 00



RX80, RX80FT, RX100	NEW CALL
FX80, FX100	LOW CALL
LQ 1500, JX-80 Color	PRICES CALL



6100	\$449 00
6300	\$749 00

MANNESMANN TALLY

Spirit 80	\$259 00
160L	\$589 00
180L	\$749 00

QUADRAM

Quadjet	\$749 00
---------	----------



8027	\$349 00
2080-IBM	\$749 00
3550-IBM	\$1499 00
8830	\$1899 00
8880-IBM	\$1799 00
Pinwriters	CALL



82 83 84 92 93 2350 2410	CALL
--------------------------	------



Needlepoint Dot Matrix	\$329 00
Compact 2 Letter Quality	\$469 00
Compact RO	\$499 00

SILVER REED

Letter Quality 400	\$279 00
Letter Quality 800	\$349 00
Letter Quality 550	\$459 00
Letter Quality 770	\$799 00



Gemini 10XPC	\$259 00
Gemini 16XPC	\$379 00
Radix 10 PC	\$849 00
Radix 18 PC	\$849 00
Powertype	\$329 00



1340	\$789 00
1351	\$1299 00
1351 Tractor	\$159 00

MULTIFUNCTION CARDS



IDEAmax - ZPR, 64K, C, S, P	\$229 00
IDEAmini - YPR, C, S, P	\$189 00
IDEAminimax - MPR 128K	\$229 00
IDEAshare Software	\$219 00

QUADRAM

Quadboard	\$229 00
Quadboard II	\$229 00
Expanded Quadboard	\$239 00
Quad 512+	\$249 00
Quad 2 Meg	\$879 00
Memory Board	\$229 00
Quad Jr. Exp. Chassis	\$339 00
Quad Jr. Exp. Memory	\$219 00
QuadMem Jr	\$229 00



Six Pack Plus	\$239 00
Mega Plus II	\$269 00
I/O Plus II	\$139 00
Memory MBII	\$249 00



Captain - 64	\$249 00
Captain Jr. 128K	\$339 00

VIDEO CARDS

Amdek-MAI	\$249 00
AST-Monograph Plus	\$409 00
Hercules-Graphics	\$349 00
Color	\$199 00
Paradise - Modular Graphics	\$319 00
Multi-Display	\$339 00
Eagle - Color	\$199 00
Quadram - Quadcolor I	\$219 00
Quadgraph	\$379 00

MAINFRAME

AST 5251	\$579 00
3780	\$639 00
BSC	\$499 00
DCA IRMA 3270	\$899 00

ACCESSORIES

Quadram - Chronograph	\$89 99
Parallel Card	\$69 99
Microfazer from	\$139 00
Efazer (Epson) 8K	\$79 99
Efazer (Epson) 64K	\$149 00
Keytronics 5150, 5161 Keyboard	Call

MEMORY CHIPS

4164 RAM Chips (set of 9)	\$29 99
---------------------------	---------

GRAPHICS TABLETS

Koala Pad w/Micro Painter	\$95 99
Personal Peripherals Supersketch	\$39 99



COMPUTER MAIL ORDER

TOLL FREE ORDER LINE **1-800-233-8950**

In PA Call: (717) 327-9575

WEST

P.O. Box 6689, Dept. B102
Stateline, NV 89449

EAST

477 E. 3rd St., Dept. B102
Williamsport, PA 17701

Order Status Number: (717) 327-9576

Customer Service Number: (717) 327-1450

CANADIAN ORDERS

Ontario/Quebec: **1-800-268-3974**

Other Provinces: **1-800-268-4559**

In Toronto: (416) 828-0866 Telex: 08-218960
2505 Dunwin Drive, Unit 3
Mississauga, Ontario, Canada L5L1T1

Open purchase orders accepted with net 30 days terms, subject to credit approval. Next day shipping on all stock items. No risk, no deposit on C O D orders and no waiting period for certified checks or money orders. Add 3% (minimum \$5) shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. Call today for our catalog.

the best prices

IBM PC SYSTEMS PRICED FROM \$1399.99

64K, 1-DS/DD DRIVE, KEYBOARD

SOFTWARE

ASHTON-TATE

Framework	\$379 00
dBASE II	\$299 00
dBASE II upgrade	\$139 00
dBase III	\$388 00
Friday!	\$179 00

ALPHA SOFTWARE

Electronic Desk	\$219 00
-----------------	----------

CDEX

Training Programs	each \$49 99
-------------------	--------------

CONTINENTAL SOFTWARE

Home Accountant Plus	\$88 99
1st Class Mail	\$79 99

ELECTRONIC ARTS

Get Organized	\$139 00
---------------	----------

FOX & GELLER

OZZ	\$289 00
Grafox	\$139 00
dUtil	\$49 99
dGraph	\$139 00
Quickcode	\$139 00

FUNK SOFTWARE

Sideways	\$39 99
----------	---------

Hayes

Please	\$269 00
--------	----------

HARVARD

Harvard Project Manager	\$229 00
-------------------------	----------

IUS

EasyFiler	\$229 00
EasyPlanner	\$169 00
EasyWriter II (spell/write/mail)	\$249 00

LIFETREE SOFTWARE

Volkswriter	\$116 00
Volkswriter Deluxe	\$169 00

LOTUS

1-2-3	\$309 00
Symphony	\$449 00

MAI

General Ledger	CALL
Accounts Receivable	CALL
Accounts Payable	CALL
Payroll	CALL
Accounting Software	CALL

MicroPro

WordStar ProPack	\$279 00
WordStar ProPack Plus	\$389 00
WordStar	\$219 00
WordStar 2000	\$309 00
WordStar 2000 +	\$369 00
MailMerge	\$89 99

CALL FOR YOUR FAVORITE PC/COMPATIBLE

Columbia Data

Compaq

Eagle

Sanyo

TeleVideo

Zenith

Corporate Buyers
Are Welcome !!!!

MECCA

Manage Your Money	\$139 00
-------------------	----------

MICROSTUFF

Crosstalk XVI	\$105 00
Remote	\$99 99

MICROSOFT

Multi Plan	\$139 00
Multi Tool Word w/Mouse	\$299 00

MULTIMATE INT.

Multi Mate	\$289 00
------------	----------

PEACHTREE SOFTWARE

Peachtext 5000	\$169 00
Peachpack (GLAPAR)	\$219 00

PFS

File	\$89 99
Report	\$79 99
Graph	\$89 99
Write	\$89 99
Proof	\$89 99
Access	\$55 99
Plan	\$89 99

ROSESOFT

Pro Key	\$89 99
---------	---------

SOFTWARE ARTS

TK Solver	\$279 00
-----------	----------

SSI

Word Perfect	\$279 00
--------------	----------

SYNAPSE

File Manager Plus	\$59 99
-------------------	---------

VISICORP

VisiCalc 4	\$169 00
------------	----------

MICROMIM

R Base 4000	\$279 00
-------------	----------

PROFESSIONAL SOFTWARE

PC Plus/The Boss	\$289 00
------------------	----------



SPI

Open Access	\$339 00
-------------	----------

SPINNAKER

Fraction Fever	\$24 99
Story Machine	\$24 99
KinderComp	\$22 99
Facemaker	\$24 99
Hey Diddle Diddle	\$22 99
Rhymes & Riddles	\$22 99
Snooper Troops 1 or 2	\$24 99
Search of Most Amazing Thing	\$24 99

INFOCOM

Witness	\$29 99
Enchanter	\$29 99
Planetfall	\$29 99
Suspended	\$29 99
Starcross	\$27 99
Zork 1, 2, or 3	\$27 99
Infidel	\$29 99

CENTRAL POINT

PC Copy II	\$29 99
------------	---------

DISKETTES

maxell.

MD 1	\$19 99
MD 2	\$29 99

Dennison

Elephant SSDD EM-1	\$15 99
Elephant SSDD EM 2	\$17 99
Elephant DSDD EM 5	\$24 99
Elephant EMSF 5 DSDD	\$34 99

VERBATIM

SSDD	\$21 99
DSDD	\$29 99

CIRCLE 185 ON READER SERVICE CARD



COMPUTER MAIL ORDER

TOLL FREE ORDER LINE **1-800-233-8950**

In PA Call: (717) 327-9575

WEST

P.O. Box 6889, Dept. B102
Stateline, NV 89449

EAST

477 E. 3rd St., Dept. B102
Williamsport, PA 17701

Order Status Number: (717) 327-9576 Customer Service Number: (717) 327-1460

CANADIAN ORDERS: All prices are subject to shipping, tax and currency fluctuations. Call for exact pricing in Canada. INTERNATIONAL ORDERS: All orders placed with U.S. offices for delivery outside the Continental United States must be pre paid by certified check only. Include 3% (minimum \$5) shipping and handling. EDUCATIONAL DISCOUNTS: Additional discounts are available to qualified Educational Institutions. APO & FPO. Add 3% (minimum \$5) shipping and handling.

CANADIAN ORDERS

Ontario/Quebec: **1-800-268-3974**

Other Provinces: **1-800-268-4559**

In Toronto: (416) 828-0866 Telex: 06-218980

2505 Dunwin Drive, Unit 3

Mississauga, Ontario, Canada L5L1T1

Printer Boss™

**Letter quality printing,
sideways printing,
RAM printer buffer,
5 alternate IBM character sets,
graphics, Greek and screen symbols,
custom font design,
high-speed character-mode output
and full control
of your Epson printer
on one plain-English menu.**



Now you can have all of these features and more for your Epson MX, FX, RX, JX and LQ-1500 printers. And all at the touch of a few keys. Printer Boss™ software is simply the ultimate in printer control!

Print letter quality on your FX printer at full text-mode speed using our unique two-pass dot-matrix approach. Use this **high-speed technique** to overprint dots which fit precisely between the dots in the standard characters, filling in the annoying spaces and greatly enhancing readability while avoiding the smearing effect of doublestrike or other print modes. Or print graphics-mode letter quality on the MX, RX and JX printers.

Print multi-page spreadsheets or reports as wide as you like, **sideways on your paper**, in a choice of five different type sizes, with automatic pagination both vertically and horizontally, at high speed and on any Epson printer.

Create a **RAM printer buffer** of from 1 to 32K, so you can print in background while using your PC for other work. Buffer your normal, letter quality or sideways printing for higher efficiency and throughput.

Download any of **5 different IBM character sets**, including the Matrix, Graphics 1 and Graphics 2 printer sets, the

Screen set and the APL set. Use IBM block and line graphics characters, IBM screen characters, Greek and APL symbols on any Epson printer. Printer Boss™ is ideal for IBM graphics software and for **screen dumps**.

Or **custom-design your own character font** using our new font design feature, and build a library of your own fonts for future use.

Printer Boss™ also allows **full menu-based operation** of all control functions of all of the Epson printers. Select and deselect pica, elite, compressed, italic, enlarged, emphasized, doublestrike, underline, superscript and subscript for scores of different type faces. Switch the LQ-1500 between draft and letter quality.

Set line spacing, right and left margins and skip-over-perforation. Load USA, France, Germany, England, Denmark, Sweden, Italy, Spain and Japan language sets. **Control** unidirectional, half-speed and proportionally-spaced printing. **Store** and retrieve 10 complete menu settings with a few keystrokes. **Emulate** the IBM-label printer for the IBM-PC.

Print **samples** from the menu, or use program modules provided for printing ASCII tables and spreadsheet and text samples. **Create ASCII files of data**,

corresponding to the stored menu settings, which can be accessed by or included in your own programs to set up the printer as you wish.

Printer Boss provides all of the above features on **one easy-to-use menu**, and it's compatible and extremely useful with such word processing and spreadsheet programs as **Wordstar**, **Lotus 1-2-3**, **Visicalc** and many, many others. The package is streamlined, professional and intended for serious work by seasoned PC users, but is **easily operable by the neophyte**. As a primary objective the development team designed the menu and its operation to minimize mental effort and fatigue in printer set-up and operation, which is particularly important for the newcomer to computers.

Printer Boss™ runs on the IBM-PC, IBM-PCjr, IBM-XT or any compatibles; PC-DOS 1.1, 2.0, 2.1 or equivalent; double-sided disk drive; 128K RAM; Epson MX, FX, RX, JX or LQ-1500 printers or compatibles.

Printer Boss™ \$59.95. With Letter Quality or Sideline™ options \$99.95. With both \$139.95. **Demo disk** \$10.00 credited to order. VISA, MC, or send check. Free info. Dealers welcome, sales kit available.

Printer Boss™

CONNECTICUT SOFTWARE
30 WILSON AVENUE
ROWAYTON, CT 06853

INFORMATION:

203-838-1844

ORDERS ONLY:

800-826-1589

CIRCLE 175 ON READER SERVICE CARD

YES! PLEASE SEND PRINTER BOSS TODAY!

CONFIGURATION

☐ PRINTER BOSS \$59.95 ☐ WITH LETTERBOSS OPTION \$99.90
☐ WITH SIDELINE OPTION \$99.90 ☐ WITH BOTH OPTIONS \$139.85
☐ DEMO DISK \$10.00

ADD \$2.00 SHIPPING ALL ORDERS. CONNECTICUT RESIDENTS ADD 7.5% OUTSIDE USA AND CANADA
ADD \$15.00 COD ADD \$2.00 PURCHASE ORDERS ACCEPTED

PAYMENT: \$

☐ CHECK ENCLOSED
☐ MONEY ORDER ENCLOSED
☐ COD
☐ VISA CARD ☐ MASTERCARD
CARD # _____
EXPIRES: _____
SIGNATURE _____
DATE _____

NAME: _____

COMPANY: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

TELEPHONE: _____

DIAMOND DELIVERS!

The Total Solution
Full Service • Full Support
Low, Low Prices

This Month's Packaged Specials

Lotus 123/dBase III
AST 6 Pack 384K/
Framework

\$689

\$899

Hayes 1200/Crosstalk
AST 6 Pack 384K/
Symphony

\$589

\$959

NEW! Wordstar 2000

Dedicated word processor with windowing,
spelling corrector as you edit, math calcula-
tions, on-screen bold, underline and footnote.

Call for information on the new Wordstar update.

NEW! Wordstar 2000 Plus

All of the features of Wordstar 2000 plus a
built in mailing list, telecommunications and
automated indexing table of contents.

dBase III
Volkswriter Dlx
Framework

\$call
\$165
\$call

Apple II Software
APPLE-IBM CONNECTION
DATA BASE MANAGER II
ELECTRIC DESK

\$139
\$call
\$219

Ashton-Tate
dBASE II
FRIDAY

\$289
\$159

Borland International
TURBO PASCAL
SIDEKICK

\$39
\$39

Comshare
CONDOR 3

\$319

Digital Research
PASCAL MT + 86
CONCURRENT PC DOS
CONCURRENT CP/M 86
C BASIC 86
CP/M 86
ACCESS MGR
DISPLAY MGR
PC DOS LANGUAGES

\$249
\$call
\$229
\$135
\$39
\$249
\$329
\$call

Dow Jones
MARKET ANALYZER
MARKET MANAGER

\$239
\$209

Financier
FINANCIER II
TAX SERIES

\$119
\$109

Fox & Lerner
QUICKCODE
dGRAPH
dUTL

\$159
\$159
\$99

Powerbase Systems
POWERBASE

\$395
\$call

Harvard Software
HARVARD PROJECT MANAGER
TOTAL PROJECT MANAGER

\$239
\$call

Crosstalk
Lotus 123
Multimate

\$99
\$call
\$279

EASYSPELLER II
EASYMAILER
GENERAL LEDGER
ACCOUNTS PAYABLE
ACCOUNTS RECEIVABLE
INVENTORY CONTROL
EASYWRITER II SYSTEM

\$59
\$59
\$call
\$call
\$call
\$call
\$195

LATTICE C COMPILER

\$309

KNOWLEDGEMAN

\$289

WORDSTAR
WORDSTAR PRO PACK
MAILMERGE
CORRECTSTAR
PLANSTAR
SUPERSORT II
INFOTRAC/STARBURST
TELMEGE
CHARTSTAR
PRO OPTION PACK

\$189
\$259
\$55
\$79
\$309
\$309
\$99
\$299
\$89
\$209
\$99

MOUSE
WORD
WORD W/MOUSE
MULTITOL FINANCIAL
MULTITOL BUDGET
PASCAL COMPILER
FORTRAN
C COMPILER
CHART
PROJECT

\$139
\$239
\$239
\$69
\$99
\$199
\$229
\$329
\$159
\$159

DOLLARS & SENSE

\$109

WORD PLUS W/BOSS

\$299

R:Base 4000
Multiplan
Symphony

\$269
\$129
\$call

CLOUT
EXTENDED REPORT WRITER

\$149
\$95

PROKEY

\$259

WORD PERFECT

\$79

PFS REPORT

\$89

PFS FILE

\$89

PFS GRAPH

\$89

PFS WRITE

\$159

PFS PLAN

\$209

SUPERCALC 3

\$139

SUPERWRITER

\$269

WARNER DESK ORGANIZER

\$call

6 PAK PLUS-64K

\$489

REACH MODEM

\$409

ALL OTHER AST PRODUCTS

\$call

SMARTMODEM 1200

\$479

SMARTMODEM 1200B

\$209

SMARTMODEM 2400

\$269

QUADLINK

\$259

QUADCOLOR I

\$349

64K EXPANDABLE BOARD

\$175

QUADBOARD EXP. TO 384K

\$45

GRAPHICS CARD

\$45

COLOR CARD

\$45

MEMORY (64K)

\$45

TO ORDER
CALL TOLL-FREE
1-800-227-0545

Software Specialists
For The IBM PC



Diamond Software Supply

7916 Capwell Drive, Oakland, CA 94621

For price quotes, information, or in California call 1-415-633-2588. We credit your order for the call.

Technical Department (415) 633-2589. International Telex 338139 (attn. 149)

IBM is a trademark of International Business Machines

CPM is a trademark of Digital Research

Apple is a trademark of Apple Computer Inc.

- Special Corporate Incentives
- Cumulative/Quantity Discounts
- Same Day Shipment
- Overnight Delivery Available
- Purchase Orders Accepted From Qualified Organizations
- IBM, CPM, Apple formats
- Expert Technical Assistance
- Full Product Guarantees
- Visa, M/C, Amer. Exp.
- Free UPS Surface w/Ppd Check

“I waste a lot of time contacting vendors and then find out they don't have what I need.”

“Suddenly I'm the corporate guru on micros, but I don't have answers to the questions I'm being asked.”

“I'm already spending too much time on product evaluations, and the field gets bigger every day.”

—If these complaints sound familiar, this is the help you need.

INTRODUCING DATA DECISIONS MICROCOMPUTERS

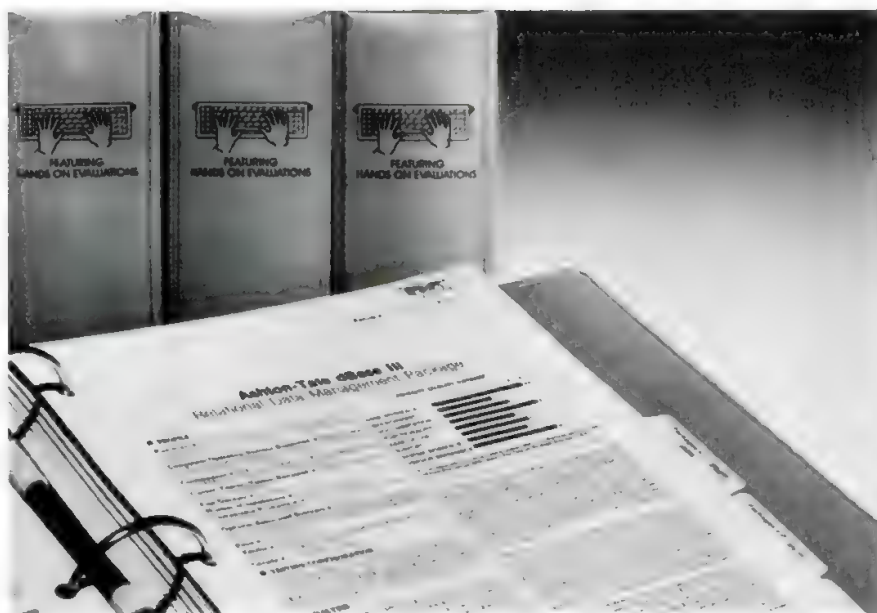
An ALL-NEW information service for the corporate micro buyer that features **HANDS-ON TESTING** of micro software and peripherals by experts in Data Decisions' own labs.

That's right, now you can get the results of hundreds of hands-on tests done under consistent, controlled conditions by our specially trained team of micro experts—who will tell you what each product's strength and limitations are, how competing products compare, and what you can expect when you bring them in-house.

And hands-on evaluations of software and peripherals are just the beginning! Data Decisions MICROCOMPUTERS is your one-step look-up source for what you need to know about LANs... PC-compatibles... specialized workstations—for ALL your micro information needs.

MICROCOMPUTERS comes to you in 3 loose-leaf volumes which are updated every month to ensure their accuracy. They give you:

- Hands-on evaluations of key software and peripheral products.
- Rating charts that let you compare how competing packages measure up in actual use.
- In-depth analyses that highlight strengths and limitations of mainstream hardware, software and peripheral products.



- Action-oriented technology reports that fill you in on issues and trends.
- Broadbased surveys on accounting software, electronic mail packages and other important areas.
- Lively monthly newsletters that bring you late-breaking industry happenings and new product announcements, point out the best articles published in recent computer magazines, and provide a summary of the month's hands-on testing scores and a calendar of industry events.
- Unlimited free telephone consulting

by micro experts whose only job is to answer your questions.

Whether you're looking for 10 micros or 100, an integrated software package, a micro-to-mainframe downloader, graphics—or the right combination of products capable of working together, MICROCOMPUTERS has the information you need.

**Data Decisions
MICROCOMPUTERS covers
the market from A to Z.
Microcomputers: desktops, intelligent terminals, UNIX systems, execu-**

tive workstations, integrated office automation workstations, supermicros, kneetops, portables, transportables... AND MORE.

Software: graphics, accounting packages, financial packages, training packages, operating systems, utilities, DBMSs, office automation, word processing, communications—PLUS the new integrated packages... AND MORE.

Expansions/Extension Cards: controllers, clocks, A to D converters, extra quad boards, interface boards, language cards, solid state disks, memory boards, processor enhancement, auxiliary processors... AND MORE.

Communications: micro LAN networks, micro modems, micro terminals, terminal emulators, micro-to-mainframe downloaders, database access packages, electronic mail... AND MORE.

Peripherals/Accessories/Support Equipment: printers, plotters, monitors, floppies, hard disks, keyboards, tape drives, OCR bar codes, sensors, power supplies, power surge protectors, cooling fans... AND MORE.

Data Decisions MICROCOMPUTERS service is:

Comprehensive: It offers you the most complete, concise, accurate information ever compiled on micros.

Authoritative: It's put together by the largest, most experienced staff of micro experts in the publishing industry today—experts who don't just read about products, but who test them in our labs.

Analytic: Hard-hitting independent analysis highlights strengths, limitation and suitability to a corporate environment of all mainstream products.

Practical: Reliable user ratings let you see how products measure up in actual use.

Convenient: One service gives you all the information you need.

"Your telephone consultants are just outstanding—a really great group. They provide timely, personal response to virtually any type of inquiry."

—Stan Leu
Director of Marketing, DS Agency Inc.
(Agents for Exxon Office Systems)
Lubbock, TX

Economical: A 1-year subscription costs no more than you would have to pay a consultant to do just one of our hands-on evaluations.

Easy-to-Use: Specially designed dot charts point you quickly to the products that meet your needs... Rating bar charts let you see at a glance how similar products compare... Easy-to-read

graphics point out the differences between models from the same vendor... Consistent formatting makes it easy to compare competitive offerings and find specific facts.

Current: Up-to-the-minute newsletters and report updates reach you every month... Complete revision of all product reports are issued at least once a year.

Personalized: Each MICROCOMPUTERS subscriber is eligible for unlimited free telephone consulting with microcomputer experts whose only job is to provide quick answers to your questions.

"Just one report saved me three nights of tinkering at a computer store on my own time. It's like having a consultant sitting right there at the end of the desk."

—Bob Butler, Mechanical Engineer
Gillette Company Boston, MA

have used Data Decisions MICROCOMPUTERS to help them make the right choices.

The annual subscription rate—complete with all 3 volumes, updates, newsletters and free unlimited phone consulting service—is only \$800 plus \$25 shipping and handling... far less than you'd have to pay an outside consultant for even one of our in-depth evaluations.

Data Decisions is so confi-

dent of your response to MICROCOMPUTERS that we are offering to let you examine all three volumes at your leisure in your own office with absolutely no purchase obligation. The only charge for this outstanding offer is the shipping and handling fee—which will be credited to your purchase if you subscribe.

Order your trial review today and see for yourself how Data Decisions MICROCOMPUTERS can save you hundreds of hours of product testing and thousands of dollars in costly purchasing mistakes.

SPECIAL NO-PURCHASE-OBLIGATION TRIAL REVIEW OFFER

Thousands of smart DP professionals and micro buyers like yourself

ACT NOW!

Complete this order form and mail today!

Data Decisions microcomputers

20 Brace Road
Cherry Hill, NJ
08034
(609) 429-7100



Data Decisions microcomputers

20 Brace Road • Cherry Hill, NJ • 08034

☐ **YES!** Please send me Data Decisions MICROCOMPUTERS for a no-purchase-obligation trial review. I understand that the only charge is a \$25 shipping/handling fee which will be credited to my purchase if I subscribe.

☐ Although your offer sounds great, I'm still not convinced. Please send me additional information.

Signature _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone (____) _____

A146/H3

**A shelf
loaded with
software is
impressive,
but**

**one simple
program
loaded with
capabilities
is better.**



To get a lot out of a printer, you need a lot of programs, right?

Wrong.

True, your customers want to change type sizes, create their own characters, and even print sideways. But you don't need to stock a lot of different printer utilities. One simple program will blow all the others right off your shelf.

Printworks. It's loaded.

 **SoftStyle™**

SoftStyle, Inc. • 7192 Kalanianaʻole Hwy • Suite 205
Honolulu, Hawaii 96825 • Phone (800) 367-5600

\$69.95 retail. SoftStyle products are distributed by Softtel and Ingram Software.

Simple Menu Control • Pivot Printing™ lets you print sideways quickly and easily • Prints full IBM character set including line graphics, math and science symbols • Foreign language characters • Easily set print modes: condensed, emphasized and more • Create new characters or entire fonts • Many fonts included • Supports thousands of popular software packages including Wordstar, dBaseII and Lotus 1-2-3.

Printworks enhances over 30 dot-matrix printers: CITICORP Prowriter (8510, 1550, 7500 all with the letter "E" included in the model number), CENTRONICS Horizon (H80), EPSON (FX-80/100, RX-80/100, JX-80, LQ-1500, MX-80/100 III with Grafix Plus), IBM Graphics Printer, INFORUNNER Riteman (Plus, Blue Plus, II, 15), NEC Pinwriter (P2-3, P3-3), OKIDATA (ML 84 Step 2, ML 92 and 93 with or without Plug 'n Play Kit, Pacemark 2350 and 2410), and STAR (Gemini 10X/15X, Radix 10/15, Delta 10/15). For the IBM PC, PC-XT, PCjr, Compaq and many other IBM compatibles. Needs 128K and DOS 1.1 or later.

THE PROFESSIONAL'S CHOICE

Lotus
1-2-3

\$299

Lotus
Symphony

\$419

dBase III

\$339

FrameWork

\$339

MultiMate

\$259

WordStar
2000+

\$319

Software

Word Processing Editors

EASYWRITER II	
SYSTEM	\$219
FANCY FONT	\$139
FINAL WORD	\$189
MICROSOFT WORD	\$239
MICROSOFT WORD	
W/MOUSE	\$289
MULTIMATE	\$259
PFS: WRITE	\$ 95
SAMNA WORD III	\$Call
VOLKSWRITER	
DELUXE	\$159
WOLKWRITER	
SCIENTIFIC	\$300
THE WORD PLUS	
(OASIS)	\$105
WORD PERFECT	\$249
WORDPLUS W/BOSS	\$319
WORDSTAR	\$199
WORDSTAR 2000	\$269
WORDSTAR 2000+	\$319
WORDSTAR	
PROFESSIONAL	\$259
XYWRITE II+	\$229

Spreadsheets/ Integrated Packages

ELECTRIC DESK	\$209
EASIBLE	\$459
FRAMEWORK	\$339
LOTUS 1-2-3	\$299
MULTIPLAN	\$135
OPEN ACCESS	\$299
SMART SYSTEM	\$559
SPREADSHEET	
AUDITOR	\$ 79
SUPERCALC 3	\$199
SYMPHONY	\$419
TKI SOLVER	\$289

Desktop Environments

DESK ORGANIZER	\$129
GET ORGANIZED	\$159
SIDEKICK	\$ 45
SPOTLIGHT	\$109

Communications/ Productivity Tools

CROSSTALK	\$105
PROKEY	\$ 89
RELAY	\$ 99
SMARTCOM II	\$109

Database Systems

ALPHA DATA BASE	
MANAGER II	\$179
CLOUT V 2.0	\$139
CONDOR III	\$299
DBASE II	\$289
DBASE III	\$359
INFOSTAR+	\$319
KNOWLEDGEMAN	\$289
PFS: FILE/PFS:	
REPORT	\$189
POWERBASE	\$219
QUICKCODE III	\$189
R BASE 4000	\$259

Languages/Utilities

CONCURRENT DOS	\$189
C86 C COMPILER	\$299
DIGITAL RESEARCH	
C COMPILER	\$219
DR FORTRAN 77	\$219
LATTICE C COMPILER	\$Call
MICROSOFT C	
COMPILER	\$309
MS BASIC COMPILER	\$249
MS FORTRAN	\$239
NORTON UTILITIES—	
NEW	\$Call
TURBO PASCAL	\$45

Project Management

HARVARD PROJECT	
MANAGER	\$219
HARVARD TOTAL	
PROJECT MANAGER	\$299
MICROSOFT	
PROJECT	\$159
SCITOR PROJECT	
5000 W/GRAPHICS	\$289

Professional Development

MANAGEMENT EDGE	\$159
SALES EDGE	\$159
THINK TANK	\$119

Home/Personal Finance

DOLLARS AND	
SENSE	\$119
FINANCIER II	\$119
HOWARD TAX	
PREPARER 85	\$195
MICROTAX	\$Call
MANAGING YOUR	
MONEY	\$129

Graphics/Statistics

ABSTAY	\$279
AUTOCAD	\$Call
BP'S BUSINESS	
GRAPHICS	\$229
CHARTMASTER	\$239
CHARTSTAR	\$209
DR DRAW	\$189
ENERGRAPHICS W/	
PLOTTER	\$279
EXECUVISION	\$259
GRAPHWRITER	
COMBO	\$389
MS CHART	\$159
OVERHEAD	
EXPRESS	\$139
PC DRAW	\$259
PC PAINTBRUSH	\$ 89
PFS. GRAPH	\$ 95
SIGNMASTER	\$179
STATPRO	\$Call
STATPAK-NWA	\$329
STATPAK-WALONICK	\$299

Accounting Modules

BP	\$329
GREAT PLAINS	\$479
IUS EASYBUSINESS	\$309
NBA	\$369
OPEN SYSTEMS	\$399
PEACHTREE	\$289
REAL WORLD	\$469
STATE OF THE ART	\$389
STAR ACCOUNTING	
PARTNER	\$249
STAR ACCOUNTING	
PARTNER II	\$599

Hardware *

Multifunction Boards

AST ADVANTAGE	\$Call
AST 6 PAK PLUS (64K)	\$249
AST 6 PAK PLUS	
(384K)	\$449
AST MEGAPLUS II (64K)	\$269
AST MEGAPAK (256K)	\$349
QUADBOARD (64K)	\$269
QUADBOARD (256K)	\$399
QUADBOARD EXP.	
(64K)	\$269
QUADBOARD EXP.	
(384K)	\$489
QUAD 512+ (64K)	\$269
ORCHID BLOSSOM	\$Call
PERSYST	\$Call
TECMAR CAPTAIN(64K)	\$279
TECMAR WAVE (64K)	\$209

Display Boards

AST MONOGRAPH PLUS	\$Call
EVEREX GRAPHICS	
EDGE	\$419
HERCULES GRAPHICS	
CARD	\$329
HERCULES COLOR	
CARD	\$179
PARADISE MODULAR	
GRAPHICS CARD	\$285
PARADISE	
MULTIDISPLAY CARD	\$285
PERSYST	\$Call
PLANTRONICS	
COLORPLUS	\$419
PRINCETON SCAN	
DOUBLER	\$Call
STB GRAPHICS	
PLUS II	\$309
TECMAR GRAPHICS	
MASTER	\$489
TECMAR VIDEO VAN	
GOGH	\$259
TSENG ULTRA PAK	\$449

Displays

AMDEK 300G/300A	\$139/149
AMDEK 310A	\$179
AMDEK COLOR II+	\$459
PRINCETON HX-12	\$469
PRINCETON MAX-12	\$179
PRINCETON SR-12	\$Call
QUADRAM	
AMBERCHROME	\$179
ZENITH 124 AMBER	\$145
ZENITH 135 COLOR	\$Call

Modems

AST REACH 1200	\$Call
HAYES 1200	\$459
HAYES 1200B	\$399
HAYES 2400	\$Call
VENTEL 1200	
HALF CARD	\$Call

Accessories

CURTIS SURGE	
PROTECTORS	\$Call
EPD SURGE	
PROTECTORS	\$Call
GILTRONIX A/B SWITCH	\$Call
MICROBUFFER INLINE	\$284
(64K)	
MICROFAZER INLINE	
(64K)	\$219
64K RAM SET	\$40
256K RAM SET	\$Call
8087 MATH	\$150

Printers/Plotters

AMPLLOT II	\$859
C. ITOH	\$Call
COMWRITER II	\$Call
COMWRITER 420	\$Call
DIABLO 620/630	\$Call
EPSON FX-100+	\$Call
EPSON LQ-1500	\$Call
EPSON JX-80	\$Call
JUKI 6100	\$419
NEC P3	\$899
NEC 2050	\$769
NEC 3550	\$1399
OKIDATA 84P	\$729
OKIDATA 93P	\$619
QUME SPRINT 1155	\$1569
TOSHIBA P1351	\$1279
SWEET P 6 PEN	
PLOTTER	\$899

Emulation Boards

ASTPCOX	\$949
AST 3780	\$809
AST SNA	\$689
AST BSC	\$ 29
BLUE LYNX	\$Call
CXI 3278/9	\$Call
IRMA	\$869
IRMALINE	\$999
IRMAPRINT	\$Call
QUAD 3278	\$949

Input Devices

KEYTRONIC S151	\$189
MICROSOFT	
MOUSE	\$139
PC MOUSE W/PAINT	\$159

Mass Storage

ALLOY PC-BACKUP	
20MB	\$1649
ALLOY PC-DISC	
20MB	\$1769
IONEGA 10+10 MB	\$2895
MAYNARD WS-1 10MB	\$Call
SIGMA	\$Call
SYSGEN IMAGE	\$Call
TALLGRASS HARDFILE	
- TAPE	\$Call
TEAC HALF HEIGHT	\$159

Networks

AST PC NET	\$Call
CORVUS NET	\$Call
DIGITAL RESEARCH	
STARLINK	\$1199
ORCHID PC NET	\$Call

*CALL FOR SHIPPING COSTS

Samna
Word III

\$CALL

Chart-Master

\$239

AST 6 Pak
Plus

\$249

Quad Board
Expanded 64K

\$269

Smartmodem
1200B

\$399

Smartmodem
1200

\$459

**FREE
SHIPPING**
on all credit card
or prepaid orders
and all orders over \$1000

LOWEST PRICE GUARANTEE!!

We will match current
nationally advertised
prices on most products.
Call and compare.

free!

Diskette
Library
Case
with your order



1-800-221-1260

In New York State call (718) 438-6057

TERMS

Checks—allow 14 days to clear. Credit processing—add 3%. COD orders—cash.
M O or certified check—add \$3.00 Shipping and handling UPS surface—add \$3 00
per item (UPS Blue \$6.00 per item). NY State Residents—add applicable sales tax
All prices subject to change



MON.-THURS. 9:00AM-8:00 PM
SUN. & FRI. 9:00AM-4:00 PM

Softline
Softline Corporation
P.O. Box 729, Brooklyn, N.Y. 11230
TELEX: 421047 ATLN UI



Draw Your Way to the Top

*PC-Draw Will Increase Your Office Productivity.
And Upward Mobility.*

Imagine. You now have the capability to graphically depict your best ideas, plans, designs and proposals. *In color or black & white.* Accurately. Completely. Dramatically. Concepts presented so forcefully—yet so simply—that you leave that critical meeting with upper management... *totally* confident of success.

And you win. Your secret weapon? PC-Draw. A powerful interactive graphics program for the IBM PC or XT[™]—*unlike anything else* on the market. Using PC-Draw you create virtually anything that can be drawn with pencil and paper. Quickly. Easily. With far greater detail.

PC-Draw is ideal for presentation graphics, proposals,

**10 DAY
TRIAL
PERIOD**

systems design, forms, diagrams... and an endless variety of charts, graphs and illustrations. PC-Draw allows you to produce drawings *up to 99 pages* long. Several templates come with PC-Draw including Flowcharting, Electrical Design, Office Layout, and Alternate Text. In addition you create and store your *own* unlimited supply of user defined symbols.

PC-Draw includes an *easy-to-follow* interactive tutorial. Requires IBM PC or XT[™] or compatible, graphics adapter and graphics monitor. Version for PCjr available. Graphic boards, plotters at competitive prices.

Shhh! Don't tell your office competition about PC-Draw. They'll catch on soon enough. For free brochure or to order call 800/2PC-DRAW. In Texas or for customer service call 214/234-1769. Micrografx, Inc., 1701 N. Greenville Ave., Suite 305, Richardson, Texas 75081.

MICROGRAFX

The Picture of Success.

(Most popular plotters and printers supported.)

CIRCLE 311 ON READER SERVICE CARD

Manual Labor?

Everyone hates manuals, but most users accept them as a necessary evil. Truly well-designed software could eliminate them by adapting itself to users' needs and preferences.

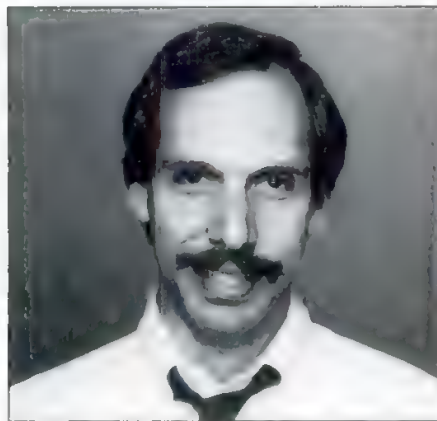
Apple has recently been fouling the airwaves with a cheap-shot TV commercial for one of its toy computers suggesting that no user can even turn on an IBM PC before slogging through three foreboding manuals. As the camera pans past a PC, a half-foot of IBM documentation thuds undecorously into view from above; when the Mac slides by, a frail booklet floats gently down to the surface like an autumn leaf.

Only the most lumpen chowderheads will be taken in by this deceit. Two-thirds of the IBM tomes in the ad are its DOS and BASIC reference manuals. To imply that the PC will remain a useless hunk of glass-epoxy and stamped steel unless the user masters EDLIN, DEBUG, and the hex scan codes for the left and right brackets is like saying that a vacationing foreigner doesn't have a prayer ordering a Big Mac unless he's memorized all 2,662 pages of *Webster's Third International Dictionary*. What the Mac's skimpy operating manual *does* connote is skimpy computing ability.

But this Cupertino con job does expose a nerve. Nobody likes manuals. Fact is, every intelligent user loathes them. And with the proper software, there's no need for them. When you lay down a few hundred bucks for the very latest thing in productivity, you want to start producing right away. You want to

stick in the disk and go. What you don't want is to struggle through hours of maddeningly turgid prose before you can do even the most primitive operation.

The software itself should help, but



Paul Somerson

there is virtually no software standardization today, and what little exists is nonintuitive. Software manufacturers regularly churn out armloads of products with utter disregard for both intuitive ease of use and preservation of the few existing standards that make sense. Best sellers create de facto standards, but not always logical ones, and these are rarely embraced by spiteful competitors. Standardization would make it too easy for users to test drive new software, and no manufacturer wants its custom-

ers to see how much better the other guys' packages are.

Since standardization is a pipe dream, the next-best step would be to offer genuine intelligence and ultracustomization. Software can be very capable and fast but is generally inflexible and stupid. Such programs make you learn someone else's commands instead of letting you use your own. They force you to do work they should have been clever enough to handle. And they are utterly passive.

Software should install itself. You should be able to rip open the package, put the raw disk in your computer, and have it direct its own configuration, asking you only the few questions it can't figure out by polling the hardware. This is easy. Virtually no software vendor does it. Instead, the packages make you hunt down a chapter and follow a snarl of instructions geared for all kinds of oddly configured systems.

Once installed, programs should offer users the option of selecting their own command language. The software should list the important commands and defaults, then allow users to customize them. There also should be a simple option of installing—with one keystroke—whole slates of commands that mimic those of the most popular packages. No set of commands in one program will cover those of another program

PC-AT®

The ultimate in PC performance.



Introducing Advantage! From AST.

The first and only multifunction board for your PC-AT, Advantage! lets you add millions of characters of memory capacity, two serial ports, a parallel port and a game port. All in a single expansion slot.

The Memory Advantage!

Advantage! provides the extra memory you need to run sophisticated integrated software such as Framework™, Lotus 1-2-3™ and Symphony™. To operate multi-

tasking programs such as IBM's TopView™ or multiuser operating systems such as XENIX™. To handle larger amounts of data, faster. Or for RAM disks.

Our unique memory addressing technique rounds out your system board to 640K, and continues memory expansion at 1 Megabyte. You can add up to 3 Megabytes of parity checked user memory in a single slot using combinations of 64K or advanced 256K memory chips. And of course, Advantage! supports your

AT's high performance bus and faster program processing speed.

The I/O Advantage! Connect printers, plotters, mice and joysticks. Add a modem to tap into CompuServe®, EasyLink®, Dow Jones® and other information networks. Or with the appropriate software, connect other terminals and create multiuser environments.

An AT compatible serial port and a parallel port are standard Advantage! features. With our optional second serial port you can attach even more peripherals,

Advantage!™

Ultimate performance enhanced.



while our optional game port lets you plug in joysticks and other cursor-control devices for business or just for fun.

The Future Advantage!

Advantage! from AST means your future is open to expansion. When you use precious slot space to your best advantage, you save space for the state-of-the-art in your PC-AT's future.

The Quality Advantage! AST's reputation is built on quality products, quality support and quality service. Our complete documenta-

tion makes the Advantage! exceptionally easy to install and use, but if it's not enough we're always here to help.

The Advantage!—only from AST. It's the advantage your IBM PC-AT needs today. Call our Customer Information Center (714) 863-1333 Ext. 5249 for more information on the Advantage! multifunction board and other AST products, or the location of your nearest dealer.

AST Research, Inc., 2121 Alton Avenue,
Irvine, CA 92714 TWX: 753699AST UR

FEATURES

Memory Expansion

- 128Kb to 3.0Mb in a single slot
- User Upgradeable with either 64K or 256K memory chips
- Split Memory Addressing rounds out AT's system memory to 640K and continues memory expansion at 1Mb

I/O Expansion

- Up to 2 Serial Ports (1 optional)
- Parallel Printer Port
- Optional Game Port

**Advantage!
Supports AT's
Full Program
Processing
Speed**

CIRCLE 101 ON READER SERVICE CARD

AST

RESEARCH INC.

*IBM PC, AT and TopView trademarks of International Business Machines Corp. Framework trademark of Ashton-Tate Lotus 1-2-3 and Symphony trademarks of Lotus Development Corp. Don Jones trademark of Don Jones & Co., Inc. EasyLink copyright Western Union. CompuServe is a Hi-R Block company. XENIX trademark of Microsoft Corp. Advantage! trademark of AST Research, Inc.

EDITOR'S SCREEN

exactly, and the software would list these missing commands and offer defaults or user customization. You should be able to toggle between the user-customized

commands and the defaults, so that a secretary or boss would not go bananas when checking or amending data on a worker's system.

Smarter Software

What would be a bit trickier—but hardly impossible—would be to give the software some real intelligence. It's not hard to make programs smart; it just means more code. It also means a potential temporary slowdown in program operation. But beginners are more interested in mastering the commands than in working at breakneck speed. Once the commands are down pat, the dilatory code can be done away with either by the program or the user.

Menu-driven software is not the answer. No one wants to plod through ten screens to get to a command accessible only on the eleventh. Macros are only a stopgap solution, since they save steps but don't offer any intelligence or guidance the user doesn't already have. A program should be sophisticated enough to notice that nine times out of ten the user starts a program with the same 20 keystrokes. The eleventh time it should offer to execute those routine keystrokes automatically and jump to the appropriate place in the program where real work begins. Or, it should monitor keystrokes, and when it notices, for example, that the user has moved the cursor only a letter at a time, flash a message mentioning the commands for moving it a word or a sentence at a time.

Obviously such intelligence would have to be implemented with great care to prevent it from becoming obtrusive and also would have to remove itself from the foreground as the user became more advanced. It would, however, notice if a new user suddenly started playing with it ("Dave . . . what are you doing, Dave . . .").

Software is beginning to saturate the cream of the market—the users with enough intelligence, curiosity, and patience to struggle up the learning curve. To reach a far wider audience, it will have to become a whole lot smarter and easier—and come down to the level of the user, instead of making the user come up to its level. ■

IT'S A MODEM! IT'S A PHONE IT'S BOTH



The Ameritec™ modem is a 300/1200-baud Intelligent modem inside a high-quality, two-line telephone. It lets you mix voice and data easily, and it all fits into one small desktop footprint—with less cable tangle.

Special
Introductory Price

\$649 Plus \$3.50
shipping and handling



Order through PC Brand
1-800-722-7263
(in New York State, (212) 410-4001)

That's a clever modem in there—autospeed, autodial, autoanswer, full duplex, asynchronous Bell 103/212A compatible. Works with all RS-232C-equipped systems. It's so intelligent it's Hayes compatible. How compatible? It runs with Smartcom II™, Hayes' own communications program, and other packages designed for the Hayes.

It's all the telephone you need, too—2 lines, selectable pulse/tone dialing, memory-dial with installed battery back-up and hold. Together, modem and phone give you instant switching between voice and data, and vice versa, without disconnecting and calling back, plus data monitoring—with its own volume control. Yet the Ameritec modem sells for the price of a high-speed modem alone. It's like getting 2 full-function telephones free. And the Ameritec modem is U.S. made and carries a 2 year parts and labor limited warranty.

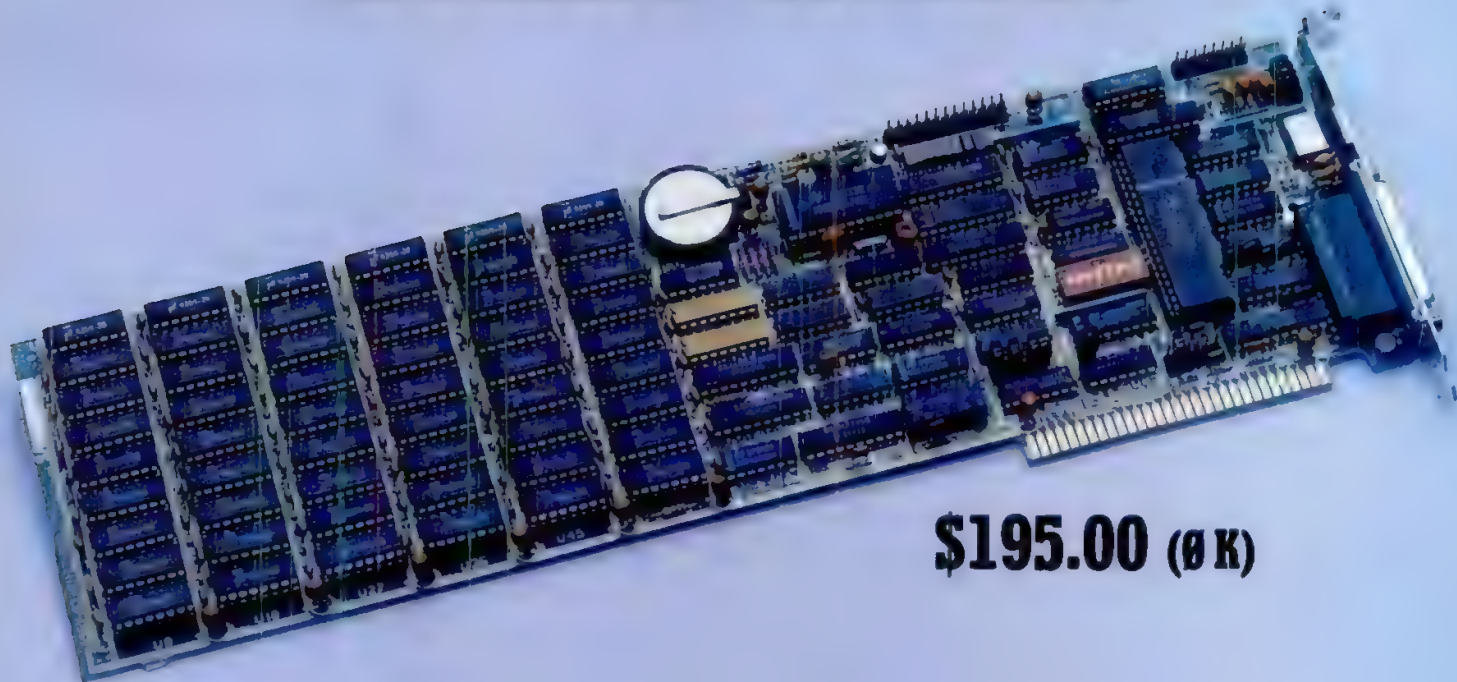


amaritec CORP.
345 East 86th St., NY, NY 10028

Hayes & Smartcom are trademarks of Hayes Microcomputer Products, Inc. Ameritec is a trademark of Ameritec Corp. PC Brand is a trademark of PC Brand. Copyright © 1984 Ameritec Corp.

CIRCLE 109 ON READER SERVICE CARD

Giant Killer



\$195.00 (6K)

Thinking of buying a multifunction board? You owe it to yourself to check out the BT6Plus.

There's a new entrant into the IBM PC multifunction board market. Basic Time's BT6Plus is a functional equivalent to AST's SixPakPlus™ and Quadram's Quadboard™, but at a fraction of the price.

BT6Plus is made with scrupulous attention to quality and detail. Basic Time runs all their boards through a battery of tests throughout the production process with all options installed. This insures that if you buy a 64K board today, it will function normally when you upgrade it later.

BT6Plus comes with memory sockets for adding up to 384K, clock/calendar parallel printer port, asynchronous communications port (RS-232C), electronic disk emulation and printer spooling software, and cable mounting bracket. All functions are fully IBM compatible. Our price, \$195.00, includes a one year warranty. 64K memory, installed and tested, is available for \$35. An optional game port for \$20.

Qubie' has been a pioneer in marketing quality products, providing service to back them up and offering them at low prices. You don't supply companies like IBM, Exxon, General Motors and Lockheed unless you have first-rate products and service. Join the tens of thousands of corporations, institutions and PC owners who have come to Qubie' for enhancement products.

Good service starts with answering your questions before and after you buy. It continues with same or next day shipment of your order. Since we only sell a few selected products, we have the information and inventory to help you fast.

We perform repairs in our own service department within 48 hours, should you ever need service during the one year warranty period.

Our price is the whole price. All prices include UPS surface charges and insurance. In a hurry? Two day UPS air service is just \$5.

Corporations, dealers and institutions, call for volume purchase price information.

CIRCLE 356 ON READER SERVICE CARD

No Risk Guarantee

If you are not completely satisfied with your purchase, you may return it within 30 days for a full refund, including the cost to send it back. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like.

Order Today, Shipped Tomorrow!

For fastest delivery, send cashiers check, money order, or order by credit card. Personal checks, allow 18 days to clear. California residents, add 6% sales tax. Hours: Mon.-Fri. 8:00 a.m.-6:00 p.m. PST
Sat. 9:00 a.m.-1:00 p.m. PST

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
Camarillo, CA 93010

London (01) 223-4569
Paris (01) 321-8316
Sydney (02) 579-3322

© Qubie' 1984

Four score and seven years ago our fathers brought forth, upon this continent, a new nation, conceived in liberty, and dedicated to the proposition that "all men are created equal."



The picture in this ad is actually an 18" by 24" collector's item—an originally commissioned museum-quality print. This month, the Gettysburg print is yours, absolutely free, at most computer stores that carry Leading Edge Word Processing.

For the name of the dealer nearest you, give us a call at 1-800-343-3436. (617) 449-4655.



LEADING EDGE™

LEADING EDGE PRODUCTS, INC.
SOFTWARE DIVISION,
21 HIGHLAND CIRCLE,
NEEDHAM HEIGHTS, MA 02461

WORD PROCESSORS AT THE LEADING EDGE

Ah, the great ones...

They organized their ideas, their intuitions, their idioms. They set them down, sorted them out, arranged them and re-arranged them till they came out right.

They used small scraps of paper to record huge hunks of Truth; primitive tools to produce profound prose. But when the words finally went forth, they

made indelible marks on all who read them.

The amazing thing is that these monumental processors of words, did it without the benefit of monumental help.

Like Leading Edge Word Processing: the easiest to use, yet most potent piece of software ever created to take full advantage of all the power inherent, but until now un-tapped, in today's

most sophisticated personal computer. (Like the IBM® PC and the even faster and more powerful Leading Edge™ & AT&T.)

The heart and soul of it is a 5 1/4" floppy disk, elegantly logical instruction manual and documentation... everything. And what you end up with is word processing at the leading edge.

LEADING EDGE™ WORD PROCESSING FROM \$100

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES CORPORATION
LEADING EDGE IS A TRADEMARK OF LEADING EDGE PRODUCTS, INCORPORATED

CIRCLE 280 ON READER SERVICE CARD

Long Live the Almighty Manual

On-line technology has made wonderful advances, such as tutorials and help screens, to aid software users, but nothing has yet been produced that renders the manual completely useless.

A fond dream of all software vendors and many users is to get rid of printed reference manuals and put documentation on-line.

Well, it isn't going to happen. While on-line documentation may be better than print in some cases, a good manual wins out in the long run.

All software documentation has three important tasks: to help a new user get up and running, to provide an overview of the product, and to give detailed instructions on how to use the product. Of course, all documentation tools can handle these tasks, but each handles some better than others.

Now, it is possible to create special software to handle the installation, and it will be necessary to eventually do so for computers to reach a truly mass market. But, for the moment, I believe that the printed manual is the only type of documentation to satisfy the first task because it is simply easier and cheaper to stick with printed instructions and a modest initial configuration program.

The introduction and initial chapters of a printed manual can very nicely describe software features—which constitutes documentation's second task—but unfortunately, not everyone reads them. New users play with the software until they think they understand it and then reach for the manual when they have

questions. The manual becomes their security blanket.

A help screen can graphically show the system and its parts with text, but if you don't specifically ask for it, the infor-



Joseph Rigo

mation is never displayed.

On-line tutorials excel at introducing software because they lead you through the entire package and let you perform a few simple functions under their control. They may hold a new user's attention for about an hour. Few people spend that much time with the introduction to a manual. However, no one runs a tutorial more than once because it is boring, time consuming, and often frustrating. Therefore, although tutorials effectively introduce software, they fail at documenta-

tion's third task—continuing education and reference. Help screens and manuals may also frustrate you, but at least they do it faster.

Help screens excel for simple answers and one-screen charts but are not very effective for teaching new functions requiring several pages of material. For example, I would not want to have to learn 1-2-3 from help screens. I like to key my entries, run a test, and then stare at the screen and the manual for more or less the same amount of time to figure out why nothing works.

Help screens also have technical limitations. First, documentation text and graphics eat up disk space and memory. Processing also suffers; even mainframe systems slow down when trying to handle extensive documentation files.

I believe the printed reference manual handles the overall documentation job better than any of the on-line alternatives devised so far. Conditions may change. And technology may eventually allow future generations to feel so comfortable with on-line information that they will give up their printed manuals, but don't count on it. Print has a way of hanging in there. ■

Joseph Rigo began writing technical manuals for IBM in 1964. He is currently president of Sysdoc, Inc., in New York.



Applied Computer Products, Inc.

SPECIALS

CONTROL DATA

Full Size 320K DS/DD\$ 179*

*"The drive IBM trusted with its logo"

TEAC

Half-Height 320K DS/DD...\$ 149

"The #1 Rated Half-Height Drive"

64K RAM Chips

200ns Pre-Tested Best Price

AST SIXPACK w/384K Best Price

MAYNARD ELECTRONICS

10MB HARD Internal Hard Disk ..\$ 899

with Tape Backup\$1,748

30 MB Internal Hard Disk\$2177

These Hard Disks can be easily installed in your PC in no time at all.

MULTIMATE w/80K Word

Speller\$ 269

EASYWRITER II/SPELLER/

MAILER\$ 195

HARDWARE

COMPUTER SYSTEMS

IBM

PC w/256K 2-360K Floppy Drives\$ Call

PC w/256K 1-360K Floppy,

1-10mb Hard Disk\$ Call

AT w/256K 1-1.2MB Floppy Drive

AT w/512K 1-1.2MB Floppy,

1-20MB Hard Disk\$ Call

PC/XT w/128K 1-360K Floppy,

1 10MB Hard Disk\$ Call

COMPAQ

w/256K 2-360K Floppy Drives\$ Call

w/256K 1-360K, Floppy, 1-10MB Hard Disk

All computer systems are configured to fit your individual needs. Each system is fully assembled and tested to ensure that all parts are in working order.

COMMUNICATION PRODUCTS

HAYES

Smartmodem 300\$ 209

Smartmodem 1200\$ 489

Smartmodem 1200B w/Smartcom II...\$ 419

TAC

Irma (Emulates 3278 Terminal)\$ Call

Irma Line (For Remote Emulation) ...\$ Call

We carry a wide variety of Mainframe Communication and Local Area Networks. For advice about which will suit your needs best give us a call and let us review them with you.

FLOPPY & HARD DISK DRIVES

ALLOY (Ideal for networks)

20-170MB Hard Disks w/Tape Backup ..\$ Call

CONTROL DATA

Full Size 320K DS/DD\$ 179

Half-Height 320K DS/DD w/Bracket ...\$ 159

I-OMEGA (Bernoulli Box)

(10-20MB) Removable Hard Disks ...\$ Call

MAYNARD ELECTRONICS

10MB Hard Disk WS-1 (XT Lookalike) ..\$ 899

10MB Hard Disk WS-2 (XT Lookalike) ..\$1049

SYSGEN

Image Backup (For XT or Maynard) ..\$ Call

TALLGRASS

20-70 MB Hard Disk w/Tape Backup ..\$ Call

TANDON

TM100-2 360K DS/DD\$ 170

TEAC

Half-Height 320K DS/DD w/Bracket ...\$ 149

Half-Height 640K DS/DD w/Bracket ...\$ 199

DISKETTES

MAXELL

MD2HD DS/Quad Density for AT\$ 45

SCOTCH 3M

DS/DD Box of 10\$ 29

VERBATIM

DS/DD Box of 10\$ 29

DISK CONTROLLERS

MAYNARD ELECTRONICS

Standard Disk Controller\$ 115

with Parallel Port\$ 165

with Serial Port\$ 175

Sandstar Modular Disk Controller ...\$ 199

All Sandstar Modular Options Avail. ..\$ Call

EXPANSION BOARDS

MAYNARD ELECTRONICS

Modular Memory Brd. w/64K to 576K ..\$ 209

Modular Multifunction Board\$ 95

AST RESEARCH

(All AST boards include SuperDrive, SuperSpool and 1 year warranty)

SixPack Plus w/64K to 384K\$ 259

MegaPlus II w/64K to 512K\$ 269

Memory Board II w/64K to 384K\$ 239

I/O Plus II\$ 139

MegaPack w/128K or w/256K\$ Call

Parallel, Serial, Game Options\$ 35

ORCHID TECHNOLOGY

Blossom w/64K to 384K\$ 249

TECMAR

Captain w/64K to 384K w/Software ...\$ 269

QUADRAM

Quadboard w/64K to 384K\$ 269

PRINTERS & PLOTTERS

EPSON

(All Printers include GRAPHTRAX-Plus)

RX-80 (120 cps, 80 cols)\$ Call

RX-80 F/T (120 cps, 80 cols)\$ Call

RX-100 F/T (100 cps, 132 cols)\$ Call

FX-80 F/T (160 cps, 80 cols)\$ Call

FX-100 F/T (160 cps, 132 cols)\$ Call

JH-80 8 Color Printer (160 cps,

80 cols)\$ Call

LQ-1500 Near Letter Quality (200 cps,

132 cols)\$ Call

Epson-IBM Cable\$ 25

HEWLETT PACKARD

HP-7470A Two Pen Plotter\$ Call

HP-7475 Six Pen Plotter\$ Call

LaserJet Prints 8 pages/min\$ Call

Bi-Directional Tractor (80 cols)\$ Call

HP-IBM Cable (works w/Lotus 1-2-3) ..\$ 50

NEC

NEC 3550 Letter Quality 35 cps\$1499

NEC 2050 Letter Quality 18 cps\$ 750

NEC 8850 55 cps\$1999

Bi-Directional Tractor\$ 235

Cut Sheet Feeder (Feeds 200 Sheets) ..\$ 299

NEC-IBM Cable\$ 30

OKIDATA

Microline 83A (120 cps, 132 cols) .Best Price

Microline 92 (160 cps, 80 cols) ... Best Price

Microline 93 (160 cps, 132 cols) .. Best Price

Microline 84 (200 cps, 132 cols) .. Best Price

Plug n' Play Best Price

Okidata-IBM Cable\$ 25

We carry paper, accoustical enclosures, printer buffers and switches. Call for specifications and prices.

• Systems • Service • Support at Competitive prices

To Corporate Buyers:

Our Company has been selling IBM Microcomputer equipment and software almost as long as IBM. We have a technical support staff available 60 Hrs/week to help you review product compatibility as well as solve any equipment or software problem you may encounter.

We offer Volume discounts and terms. Our consultants are waiting to serve you. So, Call Now!

MONITORS

AMDEK

Video 300A Amber Screen	\$ Call
Video 310A IBM Monochrome in Amber	\$ 170

PRINCETON GRAPHICS

Newest models HX-12E and SR-12P
(Call for info and price)

HX-12 RGB Hi Resolution Color	\$ 499
Max-12 IBM Monochrome in Amber	\$ Call
SR-12 Hi Resolution Color	\$ Call
TAXAN 122 TTL in Amber	\$ 159
ZENITH 124 TTL in Amber	\$ 159

VIDEO—MONITOR BOARDS

HERCULES

Graphics Card	\$ 349
Color Card	\$ 179

PARADISE SYSTEMS

Multidisplay	\$ 339
Modular Graphics	\$ 320

STB

Graphix Plus	\$ 359
--------------	--------

QUADRAM

Quadcolor I	\$ 189
-------------	--------

TECHMAR

Graphics Master	\$ 479
-----------------	--------

Call for specifications and help in deciding which board fits your needs.

MISCELLANEOUS

RAM chips 64K Set	\$ Best Price
8087 or 80287 Co-processor	\$ Best Price
KEYTRONIC Deluxe Keyboard (KB 5151)	\$ Call
MOUSE SYSTEMS—PC Mouse	\$ Call
Surge Suppressors	\$ Call
Joysticks	\$ Call

SOFTWARE

ALPHA

Database Manager II	\$ Best Price
Electric Desk	\$ Best Price

ASHTON TATE

dBase II	\$ 285
dBase III	\$ Call
Framework	\$ Call

ATI

All Software Training Pkgs	\$ Call
----------------------------	---------

BORLAND INT'L

Turbo Pascal	\$ 35
Sidekick	\$ 35

CENTRAL POINT SOFTWARE

Copy II PC	\$ 35
------------	-------

FOX & GELLER

Quickcode II or III	\$ 169
dGraph (Requires Graphics Card)	\$ Call
dUtil (Utilities for dBase II or III)	\$ Call
Quickreport (Report Generator, dBase II or III)	\$ 169

FUNK—Sideways	\$ 39
HAYES—Smartcom II	\$ 99
IMSI—4 Point Graphics (Rated #1) (Inhance Lotus Graphics)	\$ 59

INDIVIDUAL SOFTWARE

Tutorial Set (IBM PC/XT and DOS)	\$ 69
Typing Instructor	\$ 39

SORCIMI/US

EasyWriter II System (See Specials)	\$ 195
Accounts Receivable	\$ 299
Accounts Payable	\$ 299
General Ledger	\$ 299
Order Entry	\$ 299
Inventory Control	\$ 299
Payroll	\$ 369
Supercalc III (Version 2)	\$ 199

INFOCOM—Zork I, II, III	\$ 29
All games available	\$ Call

LATTICE

C—Compiler	\$ 299
C—Food Smorgasboard (C—Library)	\$ 110
Lattice Windows (Allows Windowing)	\$ 225
Float 87 (8087 support)	\$ 89
Panel (Screen Data Entry Aid)	\$ 189
Halo (Color Graphics Utilities)	\$ 125

LIFETREE

Volkswriter Deluxe w/TextMerge	\$ 169
--------------------------------	--------

LOTUS DEVELOPMENT

Lotus 1-2-3 (Version 1A)	\$ Call
Symphony	\$ Call

MICRO DATA BASE SYSTEMS

Knowledgeman	\$ Best Price
Kgraph	\$ Best Price
Kpaint	\$ Best Price
Ktext	\$ Best Price

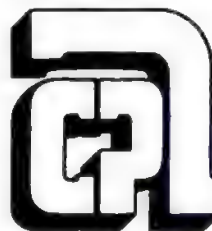
MICROSOFT

C-Compiler	\$ 349
Flight Simulator	\$ 32
Multiplan (New Version)	\$ 129
Word	\$ 239

Our Policy

• We accept VISA, Mastercard, Money Orders, Certified Checks, Cashiers Checks, Personal Checks, Wired Funds • We do not charge your card until we ship • No surcharge added on VISA and Mastercard • Allow one week for personal and company checks to clear • COD maximum \$500 Cash or Certified check on delivery • Please use local phone number for order status inquiries • Prices subject to change without notice • Returns may be subject to restocking fee.

SHIPPING (U.S.). For monitors, printers, and hard disk drives add 2% to all orders. Blue label and Next Day Air available. For all other items add \$4. Most orders shipped next day.



APPLIED COMPUTER PRODUCTS INC.

1633 Republic Road, Huntingdon Valley, PA 19006

215-322-6500 Telex 756876 UD

1-800-223-3860

When you need competitive prices, prompt service and complete support, call us.

*IBM is a registered trademark of International Business Machines.

Word w/Mouse	\$ 299
Mouse w/Software	\$ 139
Project	\$ 159
Chart	\$ 159

MICROPRO

Wordstar w/Tutorial on Disk	\$ 195
Wordstar 2000 Newest Version	\$ 269
Professional Plus	\$ 329
Wordstar 2000 Plus	\$ 329
Propack	\$ 295

MICRORIM

R.base 4000	\$ 279
Clout	\$ Call
Extended Report Writer	\$ Call

MICROSTUF

Crosstalk XVI (for Hayes Smartmodem)	\$ 99
--------------------------------------	-------

MORGAN COMPUTING

Trace 86 (Assembly Language Debug)	\$ 89
Ted (Program Editor)	\$ 69
Professional Basic (640K of workspace)	\$ 69
8087 & 80287 Support	\$ 39

MULTIMATE INTERNATIONAL

Multimate (See Specials)	\$ 269
--------------------------	--------

PETER NORTON

Norton Utilities (Newest Version)	\$ 65
-----------------------------------	-------

ROSESOFT

Prokey (Newest Version)	\$ 95
-------------------------	-------

SCARBOROUGH SYSTEM

Master Type	\$ 29
-------------	-------

SOFTWARE PRODUCTS

Open Access	\$ Call
-------------	---------

SATELLITE SOFTWARE INTERNATIONAL

Word Perfect (includes Speller)	\$ 250
---------------------------------	--------

SOFTWARE PUBLISHING

PFS/Access	\$ 65
PFS/File	\$ 89
PFS/Graph	\$ 89
PFS/Report	\$ 79
PFS/Write	\$ 79

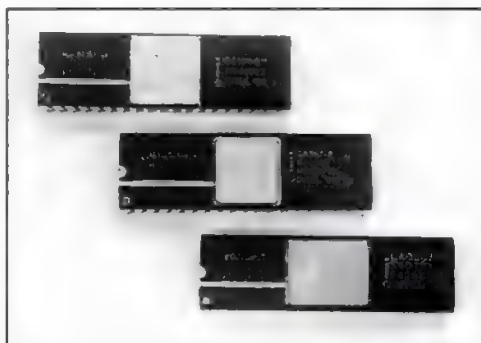
THE 8087 AND 80287 ARE IN STOCK!

MicroWay is the world's leading retailer of 8087's and high performance PC upgrades. We stock a complete selection of 8087's that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - 180 days! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 in the PC AT. Our new NUMBER SMASHER™ will run the IBM PC at clock speeds up to 9.5mhz and achieves a throughput of .1 megaflops with 87BASIC/INLINE,

Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. These include three FORTRANs, three PASCALS, APL, Intel's ASM-86 and PL/M-86, several Cs, 87BASIC/INLINE,

87MACRO, 87FFT, and MATRIXPAK. For real time or multi-user applications we offer RTOS™ - our implementation of Intel's iRMX executive. Our new products include a professional debugger with 8087 support, support for Lotus 1-2-3, and a translator that converts object modules into readable assembly language files. If you have a question about which computer, language, compiler, operating system or application package is best suited to your problem, we can answer it. Just call:

617-746-7341



MicroWay™ 8087 Support

For the IBM PC, PC XT, PC AT and Compatibles.

SCIENTIFIC SOFTWARE

87FFT™ performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from MS Fortran or 87BASIC/INLINE. **\$150**

87FFT-2™ performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT... **\$75**

MATRIXPAK™ manages a MEGABYTE! Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.2, 87MACRO, 87BASIC/INLINE, and RTOS each **\$150**

DATA ACQUISITION PACKAGE
Interactive, user-oriented language which allows the acquisition and analysis of large data streams. **CALL**

GRAPHICS PACKAGES

Energraphics (stand alone) **295**
Grafmatic for MS Fortran or Pascal **125**
Plotmatic for Grafmatic. **125**
Halo for Basic, C or Fortran each **150**

OTHER TOOLS

Alpha Software ESP. **595**
Borland Sidekick, Toolbox, or Graphics **45**
COSMOS Revelation. **850**
PSI MATHPAK. **75**
smARTWORK **895**
SPSS/PC. **695**
STSC APL★ PLUS/PC. **475**
Pocket APL **85**

DFixer

A disk utility which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly. **150**

*Requires RTOS or iRMX-86. All Intel compiler names and iRMX-86 TM Intel Corp.

RTOS - REAL TIME OPERATING SYSTEM
RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's iRMX-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM-PC, XT, PC-AT and COMPAQ **400**

INTEL COMPILERS¹

FORTAN-86. **750**
PASCAL-86. **750**
PL/M-86. **500**
87C (LATTICE/MICROWAY). **750**
ASM-86. **200**

87BASIC/INLINE™ converts the output of the IBM Basic Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC. **\$200**

87MACRO™ - our complete 8087 software development package. It contains a "Pre-processor," source code for a set of 8087 macros, and an object library of numeric functions including transcendental, trigonometric, hyperbolic, encoding, decoding and conversions. For the IBM Macro Assembler, Version 1.0 or 2.0. **\$150**

OBJ→ASM™ - a multipass object module translator and disassembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for understanding and patching object modules and libraries for which source is not available. **\$200**

87DEBUG™ - a professional debugger with 8087 support, a sophisticated screen-oriented macro command processor, and trace features which include the ability to skip tracing through branches to calls and software and hardware interrupts. Breakpoints can be set in code or on guarded addresses in RAM. **\$150**

HARDWARE AND LANGUAGES

8087-3 5mhz **\$149**
Including DIAGNOSTICS and 180-day warranty
For IBM PC and compatibles.

8087-2 8mhz **\$275**
For Wang, AT&T, DeskPro, NEC, Leading Edge

80287-3 5mhz **\$275**
For the IBM PC AT

64K RAM Set **\$24**

256K RAM Set **\$150**

128K RAM Set PC AT **\$225**

NUMBER SMASHER™ **\$995**

9.5mhz 8087 coprocessor board for the IBM PC

LOTUS 1-2-3™ 8087 Support **CALL**

FORTAN and UTILITIES

Microsoft Fortran 3.2 **239**
IBM Professional Fortran **595**
Intel Fortran-86¹ **750**
FORLIB+ **65**
STRINGS and THINGS **65**

C and UTILITIES

Lattice C. **299**
Microsoft C. **329**
C86. **299**
C TOOLS. **85**
C Trigs and Trans. **150**

BASIC and UTILITIES

IBM Basic Compiler **270**
87BASIC/INLINE. **200**
Summit BetterBASIC™ **175**
Summit 8087 Module. **87**

MACRO ASSEMBLERS

IBM Assembler with Librarian **155**
87MACRO. **150**

PASCAL

Microsoft Pascal 3.2. **209**
Borland Turbo. **45**
Turbo with 8087 Support **85**

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

Formerly MicroWare, Inc. - not affiliated or connected with MicroWare Systems Corporation of Des Moines, Iowa.

MicroWay

P.O. Box 79
Kingston, Mass.
02364 USA
(617) 746-7341

**You Can
Talk To Us!**

Letters to PC

Which Came First?

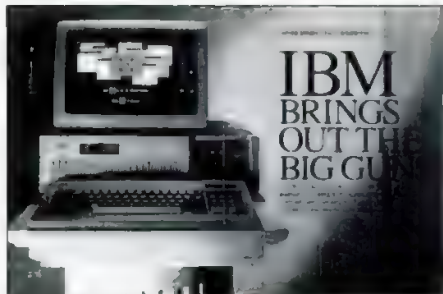
Either John Helliwell hasn't seen the Data General One portable or Bill Machrone and Charles Bermant haven't seen the STM portable because each seems to think that the machine they reviewed for the same issue was the first with a 25×80 liquid crystal display (LCD) screen.

Machrone and Bermant write in their PC News story that "the DG/One's screen is the first commercial offering of a 25×80 LCD" ("Data General Portable Sports Desktop Features," *PC*, Volume 3 Number 21, page 33). In "STM Brings Desktop Power to a Portable—Almost," Helliwell writes that the STM has "the first LCD screen on the market with a full 25 lines by 80 characters."

Can you clear this up for us and tell us which one really came first—STM portable or the DG/One.

Benjamin Vernia
Ann Arbor, Michigan

The DG One has the first 25×80 LCD that retains the standard CRT form factor.—Ed.



AT Keyboard's Shortcomings

Your enthusiasm for the "unassailable" IBM PC AT keyboard overlooks a major defect that it was unlucky enough to inherit from the PC keyboard ("IBM Brings Out the Big Guns," *PC*, Volume 3 Number 22.) Once again, there is no

second Ctrl key on the right-hand side for the convenience of touch typists.

Alan Wachtel
Milpitas, California

Linear Regression Additions

I found Dr. Jeanty's article "Performing Linear Regressions with 1-2-3" very informative (*PC*, Volume 3 Number 20).

I did find an error on page 247. The formula entered in cell F13 should be

$$+F8-F4*F5/F3$$

instead of

$$+F8=F4*F5/F3$$

Also, I was only able to reproduce the graph in Figure 4 (page 248) by substituting the following formula in cell D3:

$$+C3-1.98*(@SQRT((1/(\$F\$3-2)) *(\$F\$12-(\$F\$132/\$F\$11))))$$

In cell E3 I had to substitute the following:

$$+C3+1.98*(@SQRT((1/(\$F\$3-2)) *(\$F\$12-\$F132/\$F\$11))))$$

I would love to see a future article on multiple regression analysis using Lotus's 1-2-3.

Kenneth Atwater
Broadview, Illinois

P. Jeanty replies:

The first mistake Atwater noted was a typographical error. The second formula that he points out is an alternative method for computing the standard deviation and is perfectly valid. The formula I used (which is correct except that the last \$F\$10 should be \$F\$11) is shown in Statistics in Medicine by Theodore Colton (Little, Brown, 1975), on page 201, I

introduced Atwater's formula in my original worksheet and it provided the very same line.

I was also interested in multiple regression analysis using Lotus's 1-2-3. A friend and I tried to develop a worksheet but it became a problem because matrix and vector arithmetic are difficult to handle with Lotus's 1-2-3. There is a package called Pairstat from Davell Custom Software, of Cleveland, Tennessee, that can be used for polynomial regressions.

In just a few hours, Dr. Jeanty's article on linear regressions taught me more about using Lotus's 1-2-3 than reading the program's manual over a series of days. Plus, I got the extra bonus of learning about a valuable tool that I'll be able to use in my daily work.

P. Koeppe
Berlin, Germany

Dr. Jeanty's article "Performing Linear Regressions with 1-2-3" beautifully demonstrated how the careful planning of spreadsheet layout and imaginative use of the full range of 1-2-3's features can produce a powerful program with a wide range of applications.

The instructions were easy to follow, and the explanations of the formulas helped me to understand the correct application of the functions of Lotus's 1-2-3—particularly its graphics capabilities.

To make the matrix easier for people who want to use these equations frequently, just save the first page of the worksheet (the screen that appears when you press the Home key) and include your notes and general instructions. This will save time when you want to use the equations again.

Jack Whitehorn
Albuquerque, New Mexico

TOGETHER,
STOPPING
YOU.



RUN-TIME VERSION AVAILABLE

THERE'S NO

KnowledgeMan™ and You. The possibilities are endless.

To succeed in business, you need a partner that's fast, flexible, intelligent and easy to work with. A partner that can help turn your big ideas into well-conceived reality. One that gives you the support you need to make critical decisions confidently.

No partner can give you more of what you need than KnowledgeMan, the knowledge management software from MDBS.

A powerful partner.

KnowledgeMan helps you manage more knowledge, in more ways, than ordinary software. It can help you make better decisions on just about everything from production scheduling to market



forecasting. KnowledgeMan and its optional components offer data management, spreadsheet analysis, statistical analysis, text processing, forms management, business graphics, programming and more.

The key to KnowledgeMan's versatility is its exclusive synergistic integration, allowing you to accomplish your computing needs within one program. Unlike other software, there's no need to exit one function before entering another. The result: different kinds of processing can be intermingled. Quickly and easily.

A partner that speaks your language.

For all of its power and sophistication, KnowledgeMan is remarkably simple to understand. Even a beginner can start putting KnowledgeMan to work in minutes. With a single query, you can obtain related data from unlimited multiple tables. You can even teach KnowledgeMan to understand your own jargon.

A partner that helps you along.

The on-line HELP facility allows you to draw on 6800 lines of helpful information organized into 380 screens. If you have a problem or question, KnowledgeMan allows you to access the pertinent HELP screen immediately. Each screen is carefully designed to provide a quick reference guide to KnowledgeMan commands.

A partner that gives you room to grow.

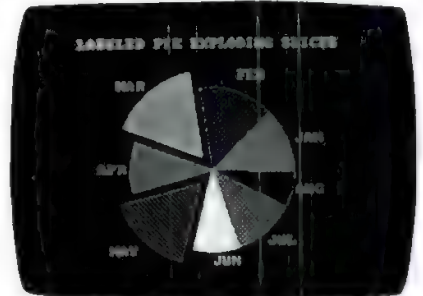
Ordinary software packages can be frustratingly easy to outgrow. Not KnowledgeMan. Each KnowledgeMan component has more power than you'll probably ever need—far more than conventional integrated programs. With KnowledgeMan, you don't sacrifice capability, capacity or convenience. So with KnowledgeMan, you spend your time solving problems—not trying to overcome software limitations.

A partner that protects your interests.

KnowledgeMan offers sophisticated security features. Unauthorized access to data is next to impossible, thanks to password checking, thousands of access code combinations and data encryption.

So your secrets are safe with KnowledgeMan.

A partner you can build on. To add yet another dimension to KnowledgeMan's capabilities, you can get fully-integrated options like K-Graph, an extensive business graphics facility that



lets you plot information in a variety of colorful graphs, charts and diagrams. For text processing, the K-Text option lets you incorporate data into written documents quickly and easily. Or, create highly-polished, full-color customized forms with K-Paint, our forms painting option. To short-cut the keyboard, put the K-Mouse option to work.

A partner you should get to know better.

To see KnowledgeMan in action, visit your dealer. Or contact Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902, (317) 463-2581, Telex: 209147 ISE UR.

It may be the beginning of a long, successful partnership.

Current version is 1.07 as of 9/10/84. KnowledgeMan, K-Graph, K-Paint, K-Text, and K-Mouse are trademarks of Micro Data Base Systems, Inc. MDBS is a registered trademark of Micro Data Base Systems, Inc.

KNOWLEDGE man

The Knowledge Management Software
from MDBS

Operating Systems: PC DOS, MSDOS, CP/M-86. Minimum RAM required: 192K, K-Graph: PC DOS only.

CIRCLE 525 ON READER SERVICE CARD



Run Lotus from your hard-disk

HardRunner™ allows you to run Lotus™ 1-2-3™ and Symphony™ from your hard-disk without putting your Lotus System Disk in Drive A.

HardRunner is a self-installing utility program that allows you to run Lotus 1-2-3 (version 1A) and Symphony (version 1.0) right off your hard-disk! HardRunner lets you use your hard-disk system the way it was designed to be used!

HardRunner makes absolutely no alterations to your Lotus or Symphony programs. Quit worrying about losing or destroying your System Program Diskettes. Avoid the hassle of placing a Diskette in Drive A in order to run a program that already resides on your hard disk. So order HardRunner today and put your System Program Diskette safely away.

HardRunner works with the IBM® PC, XT and AT, true compatibles, and the TI™ Professional. PC or MS DOS version 2.0 or higher is required.

So run with the Best! Run with HardRunner! 24 hour Toll Free **1-800-453-5433**. In Utah call 1-800-662-2500.



Please send me your new HardRunner hard-disk utility. **\$29.95**
(\$29.95 plus \$5.00 shipping and handling)
Utah residents add 5% sales tax.

Name _____

Address _____

City _____

State _____

Zip _____

Enclose check, money order or
VISA/Mastercharge # _____

Nostradamus, P.O. Box 3167, Ogden, Utah 84409

LETTERS TO PC

SAT Help On-Disk

I found Mark Malamud's review of the *OWLCAT 60-Hour SAT* course very beneficial ("New Help in the SAT Grind: Study-on-a-disk," *PC*, Volume 3 Number 18). I would like to read a comprehensive review of other SAT-related programs, especially ones that discuss cost/benefit analysis or have some data showing effectiveness. This would be an interesting project that would be of great value to the educational community.

Patrick Sweeney, Ph.D.
Atlanta, Georgia

Mark Malamud replies:

I am not aware of any comprehensive reviews of SAT software. However, PC Magazine is planning to run a broad cost/benefit analysis of several on-disk study-aid programs. Look for it in an upcoming issue. In the meantime, several companies have SAT-related packages, including Krell Software, HBJ Software, CBS Software, and Barron's, all in New York, and Intellectual Software in Connecticut.

Network Speed Race

In a PC News story on IBM's PC Network, Bill Machrone writes, "3Com's EtherSeries is the current PC speed champ, with a 10-megabit data rate" ("IBM Switches to Sytek's Broadband for PC Network," *PC*, Volume 3 Number 20, page 35). The implication is that PC Network is slower than EtherSeries because its channel data rate is only 2 megabits per second.

Our experience with PC-based LANs shows that channel data rate has little to do with overall performance. It is the networking software that makes the greatest difference.

Our benchmarks indicate that 3Com's EtherShare is a poor performer in spite of its channel rate. Orchid's PCnet is a better performer for our applications even though its channel data rate is only 1 mbps. Novell's NetWare is an example of networking software that has what we

DATAEASE™

*"I was very impressed
with its overall performance
and features... excellent interactive
and data quality assurance capabilities
... relatively easy to master..."*

Bill Jacobson
From a feature article in
BYTE, October 1984

Over 20,000 large and small business clients worldwide have turned to DATAEASE to increase productivity. In fact, leading software suppliers to Corporate America like MIS, Inc. have recently sold more DATAEASE than dBASEIII®, Symphony™, Framework™ and R:BASE™ 4000!

DATAEASE, with its ideal combination of power and ease-of-use lets you harness the full power of your micro to create forms and custom menus; gather, sort, group and calculate statistical information; update and link files; generate standard or custom reports; interchange data with mainframes and popular programs.

DATAEASE, the complete information management system. Available through highly competent dealers throughout the U.S. Call or write for information on The SOFTEASE Family of Products™: DATAEASE, WORDEASE™, GRAPHEASE™, DOSEASE™.

DATAEASE PCM-2/85

Demonstration Diskette

Check one: ☐ IBM PC ☐ WANG ☐ DEC ☐ TI
☐ Check attached for \$10. Send information package with demonstration
☐ Send information only

Name

Title Phone:

Company:

Street:

City: State: Zip:

Software Solutions, Inc., 305 Bic Drive
Milford, CT 06460 • 203-877-9268 • Telex: 703972

For dealer, corporate and product information call:

800-243-5123

Scandinavia West Soft A/S, Alesund, Norway, (47) 71-41141	South Africa Dataflex, Craighill, 11724-6555
United Kingdom Sapphire Systems, Essex, 01-544-0582	West Germany Markt & Technik, Munich, 089-4615-0

© 1985 Software Solutions, Inc.



(Formerly Warehouse Software) Call for programs not listed
Technical & Other Information (602) 246-2222
TOLL-FREE ORDER LINE 1-(800) 421-3135

FREE! PRINTER SET SOFTWARE

Purchase an Okidata, Epson or Gemini printer and receive at no charge a menu driven program to set print characteristics or to make your computer function as a correcting typewriter. Retail value \$35. Available for most disk formats.

DATA BASE MANAGEMENT SYSTEMS

Fox and Geller Quickcode	\$145
Knowledgeman	\$249
Condor III	\$295
NWA Statpak	\$265
Tim IV	\$245
Infostar+	\$175
FRIDAY	\$159
Personal Pearl	\$215
PFS File	\$79
Electric Desk	\$195
RBase 4000	\$265
CLOUT 2	\$129

WORD PROCESSING

Wordstar, Pro Pack	\$245
Samna III	\$335
Wordstar 2000 for IBM PC	\$269
Wordstar 2000 +	CALL
Leading Edge Word Processor/Merge	\$85
Mail Merge or Correct Star	Call
Microsoft Word With Mouse	\$284
Word Perfect	\$225
Volkswriter for the IBM PC	\$110
Volkswriter DeLuxe	\$154
Random House Spell Checker	\$36
PFS Write	\$78
Multimate	\$235
Peachtext 5000	\$185

SPREADSHEETS

Calstar	\$99
Supercalc II	\$145
Supercalc III	\$160
Microsoft Multiplan	\$119
ITK Solver	\$259
Lotus 123	\$294
Symphony	\$415

ACCOUNTING

TCS, equivalent of Peachtree - Specially augmented by Warehouse Software. Customized for your IBM PC Terminal and Printer - GL, AR, PA, AP, CP/M-80, CP/M-86 for PC XT, DOS 1.1, 2.0. Each Module . . . \$65 For All Four \$249

CYMA	Call
Dollars & Pence	\$95
MBSI Accounting (Real World)	\$350

TRANSFER PROGRAMS

Hayes Smartcom	\$85
Move-it	\$79
Microstuff Crosstalk	\$95

**BEST PRICE IN U.S.
 FOR IBM PC OR CLONES**
 Multifunction Board - Includes Async Adapter, Parallel Adapter, Clock with battery back-up and Software, 64K memory expandable to 384K, 1 year warranty

\$235

LANGUAGES

Lifeboat Lattice C Compiler	\$295
Microsoft C Compiler	\$315
Microsoft Pascal Compiler	\$215
Microsoft Basic Compiler	\$235
Microsoft Basic Language	\$225
CP/M-86 for IBM PC	\$37
Concurrent CP/M 86	\$160

FOR PC DOS

PC Paint	\$85
Norton Utilities	\$48
Copy II PC	\$24
Prokey V3.0	\$79
Harvard Project Manager	\$225
Microsoft Flight Simulator	\$32

HARDWARE

ABC Printer Switch	\$85
Micro Fazer Parallel	\$185
Hayes 1200 Modem	\$450
Hayes 1200b Modem for IBM PC	\$379
64K RAM Chips (9) 150 NSEC	\$34
Anchor Signalman 1200 baud Modem	\$235
10 MB Int. Hard Drive for the PC	\$750
30 MB External Hard Drive for IBM PC	\$1695
10 MB External Hard Drive for IBM PC	\$895
Princeton RGB Monitor	\$459
Taxan RGB Vision 425	\$399

COMPUTERS

ITT Computer 256K	Call
IBM Computer	Call
Corona Computer	Call
Televideo Portable & Software	\$1795

BOARDS FOR THE IBM PC OR LOOKALIKES

Hercules Color Board with Par. Port	\$169
AST Six Pack	\$245
384K Board with 256K	\$275
Quadcolor I	\$185
STB Graphics II Board	\$335
Tecmar Graphics Master	\$495
New Quadram Multifunction Board	Call

PRINTERS

Dot Matrix Printers include a Free \$35 Print Set Program	Call
Gemini 10X	\$245
Gemini 15X	\$345
Okidata 82A, 83A, 93P	Call
Okidata 92P	\$369
Okidata 84P	\$675
Juki 6100	\$389
Juki 6300	\$699
Call on all Epson Models	
Silver-Reed	Call
Toshiba 1351	\$1245
Abati LQ20	\$299
Diablo	Call

TERMS: Prices include 3% cash discount. Add 3% for charge orders. Shipping on most items \$5.00. AZ orders +6% Sales Tax. Personal check, allow ten (10) days to clear. Prices subject to change.

TOLL-FREE ORDER LINE 1-(800)-421-3135

WAREHOUSE DATA PRODUCTS

2701 West Glendale Ave., Suite 6
 Phoenix, AZ 85021

LETTERS TO PC

call "the right stuff." It significantly outperforms 3Com's, Orchid's, and most other Network Software.

I expect that IBM's PC Network also has the right networking software and will take advantage of the on-board 80186 processor and memory. The broadband nature of the network implies that IBM has other things in mind for PC Network in the future.

Ed Sawicki
 Beaverton, Oregon

Solar Energy Software

I really enjoy *PC Magazine*, and I look forward to every issue. Your articles have brought me a long way. "Project: Database" was especially helpful (*PC*, Volume 3 Numbers 11-17).

I am presently looking for a solar energy home design program. Can you help me find one?

Robert E. Potter
 Richland, Washington

We suggest that you contact the Berkeley Solar Group for information on solar software programs. Their address is 3140 Grove St., Berkeley, CA 94703, (415) 843-7600.—Ed.

Pleased with the Gemini 10X

I found your comparative review of printers very useful. However, as a satisfied user of the Star Gemini 10X printer, I take strong exception to M. David Stone's totally negative review of my favorite printer ("Dot Matrix Printers: Character Building," *PC*, Volume 3 Number 23, page 145).

After a year and a half of using my Gemini 10X daily, the only substantial complaint I have is that the ribbon does indeed occasionally slip off the guide. I have found that the thickness of the ribbon is the main problem. If a situation comes up in which you have to replace the ribbon with one that is thicker than the original, you might run into problems. If you pay attention while threading the ribbon during installation and

LETTERS TO PC

check the ribbon tension daily, you will be likely to eliminate the problem, or at least keep problems to a minimum.

Stone must have received at least a year-old version of the user's manual. When I purchased my Gemini 10X, it came with a cheap, hard-to-read manual. Shortly afterward, I received a new, typeset, and beautifully illustrated, 282-page manual with a colorful cover. I have found that the manual clearly illustrates all of the printer's features including paper loading, ribbon changing, and correctly selecting alternate print patches and graphic uses. I use the manual often and have found it easy to use and very helpful.

Stone claims that the Gemini 10X produces poor print quality. I disagree. I use the normal single-pass 10-pitch for my work, and I've never received any complaints about its quality. In fact, people have even asked me which printer I use and how it produces such clear print.

Maybe Stone did have a bad experience with his Gemini 10X, but I feel that his review does a disservice to a capable, well-made printer.

Adam F. Carr
Memphis, Tennessee

M. David Stone replies:

I stick to my original impressions of the Gemini 10X. The ribbon that I had difficulty with was the ribbon that came with the printer. Also, the manual that I used with the printer was the one that Star Micronics sent to me. I can only review what I see.

How to Write to PC

Do you have a comment, compliment, or criticism about something you read in PC? A question you'd like to open up to other readers? Send it to Letters to PC, PC Magazine, One Park Avenue, New York, NY 10016. We are not able to answer letters personally.

All letters become property of PC Magazine and may be subject to editing. We cannot print letters that do not include a name and address.



STOP SOFTWARE PIRACY . . .

. . . with one of our new, sophisticated copy prevention programs.

For Disk Security

- PADLOCK II *
- COUPON *
- PC PADLOCK

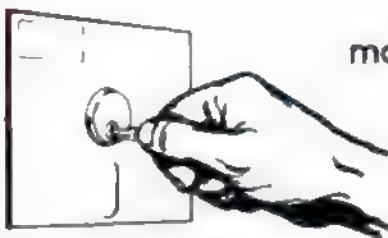
*Preformatted & Protected Disks

for Data Security

- DATA PADLOCK
- PC CRYPT

We also offer programs for communications security.

Why should your valuable data or useful software program become available in the Public Domain?



Call or write for more information.

**LENCO
ENGINEERING INC.**
3920 Ridge / Arlington Hts., IL 60004
(312) 392-2492

CIRCLE 136 ON READER SERVICE CARD

Rated #1 in the Software Digest's overall evaluation rating.



In the time it takes to win your next match... you can finish off your 1984 tax return.

You'll have the advantage of every conceivable tax cut.

With PC/TaxCut even the most grueling tax returns are blissfully simple.

You don't have to be a tax or computer expert to save time and money on your next return. PC/TaxCut calculates and prints your 1040 long form and 21 other forms and schedules. Gives you professional, computer printed returns—the kind the IRS just loves to see.

Our guarantee.

If PC/TaxCut goofs we pay the penalty.

In the unlikely event that PC/TaxCut makes a mathematical miscalculation in your tax return and the IRS requires you to pay a penalty as a result, we'll pay it for you. Complete information on this conditional guarantee is available on request from Best Programs.

Tax break point: Call or write today

For immediate delivery of your PC/TaxCut program or for more information, phone us toll free at 1-800-368-2405. Or complete the coupon below and mail today.

Yes, I want to be a winner on April 15, 1985.

☐ Send me more information about PC/TaxCut

☐ Send me PC/TaxCut for \$195, plus \$4.50 postage and handling. (Virginia residents add 4% sales tax.)

☐ Check enclosed

☐ Please charge my credit card:

☐ American Express ☐ Visa ☐ MasterCard

Card number: _____

Ex. Date: _____

Name: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: (_____) _____

BEST PROGRAMS™

"The Quality Software Company"

5134 Leesburg Pike Alexandria, Virginia 22302

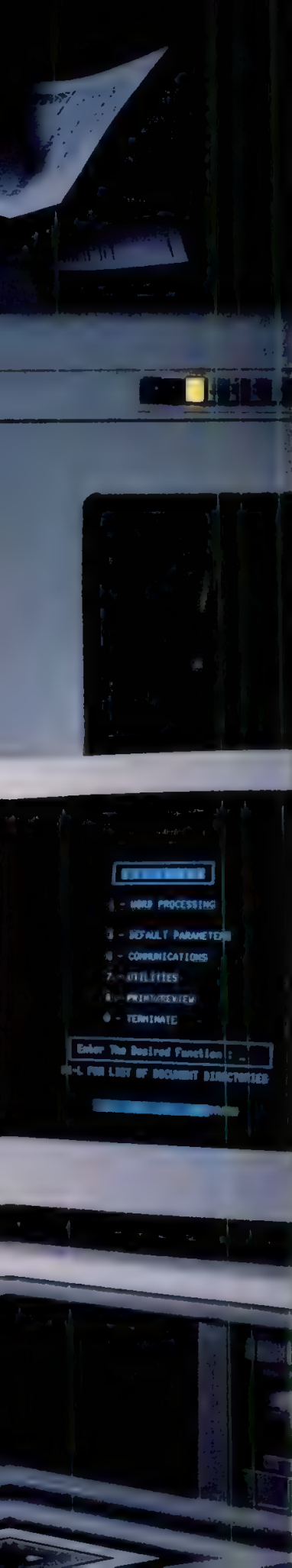
Phone Toll-Free 1-800-368-2405

CIRCLE 131 ON READER SERVICE CARD

MASS 11

In today's corporate paper chase,
does your word processing package
move the message?





Paper. Your organization revolves around the generation of hundreds upon thousands of varied documents: short memos, statistical reports, sales announcements, meeting minutes, presentations, lengthy policy manuals, operations manuals, scientific notations, footnoted briefs, text integrated with graphics, and simple rough drafts.

With so many word processing needs to fill, you're looking for a package comprehensive enough to tackle any task. Since each department in your organization depends upon transferring vital information, you need a word processing package sophisticated enough to communicate between shared logic and stand-alone systems. And, because you want to make a decision that will be right for your organization now and later, you need a software package that will progress with you toward the fully automated office.

All you really need is MASS-11.

MASS-11 delivers more in one package than others promise in ten. Over 120 major universities, 35% of the top 50 Fortune 500 companies, 80% of the aerospace industry, numerous legal firms, financial institutions, and governmental agencies agree. Our superior—yet easy to use—word processing program can bring your office of the future into operation today.

Microsystems Engineering Corporation, a company built on the premise of listening to the needs of its customers, continues to respond to what it hears. This time MEC has

developed a communications package tailored for the MASS-11 environment: a menu-driven communications package enabling the transfer of documents between the IBM PC, IBM PC/XT, IBM PC/AT, or Digital Rainbow 100+ personal computers and computers from the entire line of Digital VAX systems.

MASS-11's many advantages include the most in-demand features on the market, and are present in both the personal computer and VAX system packages. Topping the list are: attributes, automatic pagination, spelling and hyphenation dictionaries, built-in sort/merge capabilities, list processing, automatic table of contents generation, equation editing, automatic footnoting, page and paragraph numbering, user defined keys, built-in four function calculator, integration of graphics with text, columnar mathematics and editing, glossaries, split screen editing, user-definable defaults, plus many, many more.

And because you need more than just features from your word processing solution, MEC offers: responsive customer and technical support provided through telephone, 24-hour VAXMail hotline, and a system Bulletin Board posted with user news and information. Comprehensive system level documentation, thorough training programs (conducted at your site or ours), and user friendly documentation—from quick reference materials to user aids and comprehensive reference manuals—round out the package.

For more information on how you can move messages with MASS-11, simply detach, fill-in and mail the inserted postage-paid reply card, or phone MEC at 312-882-0111.

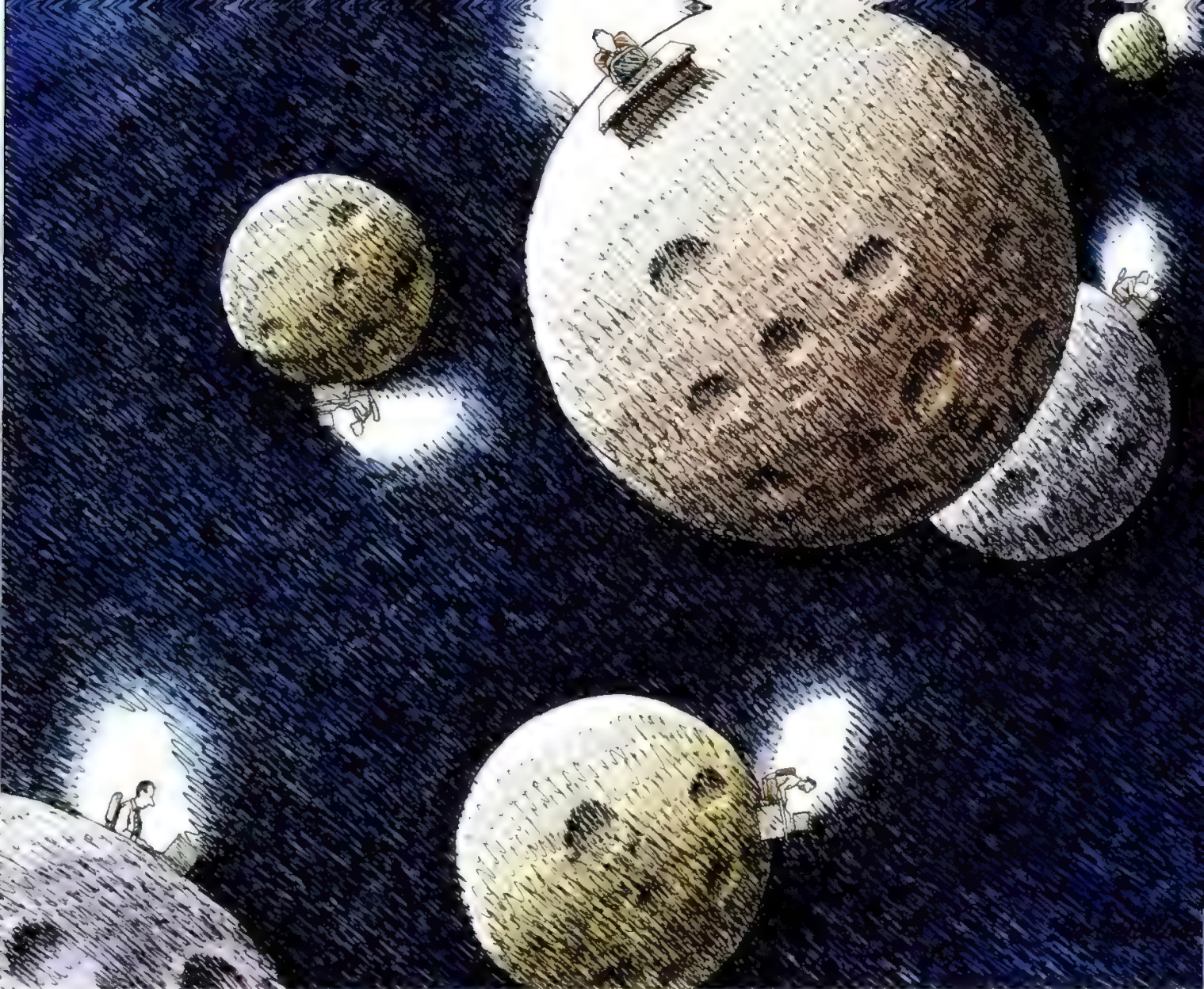
MASS 11



MICROSYSTEMS ENGINEERING CORPORATION

2400 W. Hassell Road • Suite 400 • Hoffman Estates, Illinois 60195 • (312) 882-0111 • Telex 703-688

© 1985 Microsystems Engineering Corporation. All Rights Reserved. CIRCLE 350 ON READER SERVICE CARD
Trademarks: Digital Equipment Corp.—VAX, Digital Rainbow 100 Plus, IBM-IBM PC, IBM PC/XT, IBM PC, AT;
Microsystems Engineering Corp.—MEC, MASS-11 and MASS-11pc



With Network Revelation[®], you're not alone.

Span the void that separates you from other PC's. Be as one with a universe of data. Be a true network with Network Revelation[®].

Network Revelation is more than a relational database management system. It's a complete applications environment for most microcomputer networks. That's not dreaming about the future. It's low-key raving about a capability of the present.

With Network Revelation, you can send and receive data on local area networks and remote file servers. Rev's data dictionaries let you add or restruct-

ture fields at will, saving ages of programming time. And our menu-driven applications generator and procedural language are eons ahead of other databases.

The possibilities are infinite. Distributed processing systems linking worlds. Accounting, inventory and order entry systems connected for instant access to data by a galaxy of users. And your data is secure with complete file or record locking.

REVELATION co-exists with MS-DOS[™]. So you can transport Lotus 1-2-3[™], Multiplan[®] or other data from

PC to PC—using popular routes like Novell, Ethernet or 3 Com[™]. You can even evolve files from primitive, single-user databases into a powerful Rev application.

Encounter the future of distributed data processing today. Revelation costs just \$950.00*. Network Revelation starts at only \$1495.00* for a complete four-user system. So call us and we'll arrange for an unforgettable demonstration with a Cosmos rep in your area.

MS[™] and Multiplan[®] of Microsoft Corporation.
1-2-3[™] of Lotus Development Corporation. 3 Com[™]
of 3 Com Corporation.

*Suggested U.S. list price.

Cosmos, Inc., 19530 Pacific Highway S.

COSMOS[™]

CIRCLE 218 ON READER SERVICE CARD

Seattle, WA 98188, 206-824-9942

Full-Screen Output Fast and “Compatible”

Two “screen drivers,” along with the ANSI device driver, solve the problem of writing information on the computer’s display screen—one that writes direct to memory and one that uses BIOS.

The practical problems and issues involved in trying to write programs that will work on the entire PC family, present and future, (and also on as many other computers as possible) are important to everyone. They are compounded by the requirements that the programs run under all versions of DOS, present and future, as well as with windowing systems such as *TopView*.

Developers don’t want to rewrite their programs for every new machine or DOS that comes along. And everyone who uses PCs wants the programs we use to move easily into the future, working without any problems on new products like the PC AT and DOS 3.1.

The issue boils down to the problem of writing information on the computer’s display screen. Basically, everything else that our programs do can be done easily and efficiently with standard DOS services; so it’s practical to write DOS-generic programs, programs that will work on any version of DOS and any computer that uses DOS. But when it comes to full-screen output (writing information at liberty anywhere on the display screen), DOS lets us down.

The Crux of the Matter

I’ve talked about this problem in a theoretical way in the past, but recently I’ve had to face it when I rewrote the software

I sell. From that process, I learned some tips and tricks of how to do screen output well. As a software developer, I could treat what I’ve learned as trade secrets, as many do. Frankly, though, we’ll all be



Peter Norton

better off the more we write our software in a way that does not limit how widely it can be used.

As I discussed in the last issue, the practical solution I found was to create three different “screen drivers,” three sets of subroutines that do the work of placing information on the computer’s display screen. The working parts of the program fire the information they need displayed to a master video handler, which then in turn routes the request to whichever of the three drivers

happens to be active at the time.

These drivers have varying degrees of speed and “breadth.” The fastest is the narrowest—it writes information directly to the IBM display screen memory, and so it works only on computers that exactly mimic the PC and its two original display adapters (more on this later—hot news). The middling driver uses the official IBM PC BIOS services; so it’s less of a performer than the first driver, but it’s usable under broader circumstances than you might think. The crummiest driver uses the DOS facility known as the ANSI device driver (covered in the last issue). This driver is slow, but it’s supposed to work on any DOS computer, no matter how incompatible it may be with the IBM PC—true in theory and mostly true in practice.

What’s the point of two different IBM-specific drivers—the direct-to-memory driver and the use-the-IBM-BIOS driver? You might think that each is so IBM-specific that there’s no point in having both. But that’s not true. The second driver, the one that uses IBM BIOS service calls, actually works in a number of non-IBM circumstances. You see, many personal computers don’t exactly match the PC on a hardware level but show a high degree of IBM compatibility by mimicking the IBM BIOS calls. That’s compatibility on a software level, as op-

TOLL FREE
ORDERS ONLY! **800-631-0962**
(INSIDE CALIFORNIA) **800-521-6162**

Customer Service HOTLINE
(408) 371-9078

GUARANTEED the LOWEST!

OUR PRICE GUARANTEE - It's Simple! We'll beat any ad in this magazine - same terms - call TOLL FREE for details!

DCC DISCOUNT COMPUTER CENTERS
OUR CUSTOMER SATISFACTION GUARANTEE: If for any reason your DCC purchase fails to meet manufacturers specifications within 30 days of purchase, please return it to us for a full refund or exchange of your choice! Sorry, software excluded due to copyright laws.

EPSON all models!

RX FX and LQ1500
also NEW JX80
(7 colors)

PRINTER SALE!!!
models
82/83/84
and 92/93!!
also 2410 (350 cps!)

OKIDATA

IBM PC

or 2 drives/256K,
10 mg hard disk

\$2495

\$1695 2 drvs 256K

IBM XT

10 mg. hard disk
256K, 1-360Kb drive only **\$3495**

FRAMEWORK \$355

ASHTON • TATE

*****SPECIAL*****

\$355 dBASE III

COMPUTERS

IBM PC & XT See special above!!!

PC with 1 drive/64K 1395
PC with 1 drive/256K 1575
PC with 2 drives/256K 1695
PC with 10mg HD/2 drvs/256K 2495
XT with 1 drive/128K 3449
XT with 2 drives/256K 3695

MONITORS

IBM MONOCHROME 259
COLOR 589
AMDEK 300G 129
300A 145
310A 165
COLOR 600 419
COLOR 700 469
TAXAN 12" Green 114
12" Amber 117
420 RGB 439
PRINCETON HX-12 467
SR-12 649
MAX-12 184
ZENITH 122 - 12" G 93
12" A 93
124 MONO - IBM 169
133 RGB 446
135 RGB-COMP 475

MODEMS

HAYES 300 199
1200 468
1200B IBM INTERNAL 389
MICROMODEM II E 209
ANCHOR MARK XII 259

PRINTERS

*****DOT MATRIX*****

EPSON RX 80 100 cps 239
RX 80 P/T 100 cps 294
RX 100 100 cps, 132 col 399
FX 80 or JX 80 best price
FX 100 160 cps, 132 col In
LQ 1500 200 cps NEW! magazine
OKIDATA 82A/83/84 Save
92P All Models
2410 Drastically Reduced!!
GEMINI 10-X 239
15-X 349
DELTA 10 or 15 Special
RADIX 10 or 15 \$Call

*****DAISY WHEEL*****

PRIMAGE 155 cps, SER PARR 1395
w/Cut Sheet Feeder 1695
BROTHER DAISY WHEEL
HR-15 339
HR-25 569
HR-35-36 cps! 799
JUKI 6300 749
DIABLO 620 829
36 1275
630 1669
DYNAX DX-15 599
NEC all models \$Call
QUME all models \$Call

DRIVES

IBM 360 KB 219
TANDON 100-2 360KB 185
APPLE DRIVES Sale 149

TEAC Hi-360 KB 124
SHUGART Hi-360 KB 115
COGITO 10 MG H D W CONTRL 699
ATARI INDUS GT 349

IBM SOFTWARE

*****SPREADSHEET*****
FRAMEWORK Monthly Special 355
FRIDAY 195
SUPERCALC 3 228
MULTIPLAN 136
*****IBM WORDPROCESSORS*****
WORDSTAR PRO PACK 249
PFS WRITE 84
MULTIMATE 249
WORD W/MOUSE 269
VOLKSWRITER DELUXE 159
PFS PROOF 84
*****IBM DATA BASE*****
dBASE II 284
dBASE III 355
PFS FILE 84
CONDOR III 249
R-BASE 4000 279
R-BASE CLOUD 129

*****IBM MISC*****
SIDEKICK 45
COPY II PC 29
THINKTANK 129
PROKEY 3.0 79
HARVARD PROJECT MGR 245
SIDEWAYS 45
NORTON UTILITIES 55
PFS REPORT 79
DOW JONES ANALYST 219
SET FX + 47
*****IBM GAMES*****
FLIGHT SIMULATOR 34

IBM - BOARDS

PINBALL 39
MATHBLASTER 45
FROGGER 28
ULTIMA II 35
ZAXXON 35
GATO SUB SIMULATOR 35

HERCULES GRAPHICS 315
HERCULES COLOR New! 175
AST SIX PAK W/64K 249
MEGAPLUS 259
STB GRAPHX PLUS 322
EVEREX GRAPHIC EDGE 379
H.D. CONTROLLER 299
MAGIC CARD 199
QUADRAM QUADBOARD W/64K 269
QUADLINK 449
IBM MONOCHROME 249
COLOR GRAPHICS 219
PLANTRONICS COLOR PLUS 358
MA SYSTEMS PC PEACOCK 358
COLOR GRAPHICS 235
TECMAR GRAPHICS MASTER 475

IBM ACCESSORIES

64K RAM CHIPS 200ns 39
150ns 39
IBM KEYBOARDS 179
KEYTRONICS 5151 NEW! 199
5150 189
MICRO-SOFT MOUSE 144
MOUSE SYSTEM-MOUSE 139
KOALA PAD 85
JOYSTICKS - KRAFT/HAYES 45

APPLE - BOARDS

ORANGE MICRO GRAPPLER + 113
BUFFERED w/64K 168
MICROMAX GRAPHMAX 99
VIEWMAX 80 139
VIEWMAX 80E W/64K 189
MAC DISKETTES 26
16c PRINTER INTERFACE 59
SUPER COOLING FAN 49

ACCESSORIES

PRINTER RIBBONS all makes Low!!!
64K RAM chips SALE 39
VERBATIM SS/DD diskettes 21
DS/DD diskettes 27
DYSPAN SS/DD diskettes 26
DS/DD diskettes 34
DISK MINDER-PLEXI (75) 19
DISK MINDER W/KEY (100) 24
SURGE PROTECTOR Compugard 59
PTI POWER BACK-UP 200 w 299
300 w 399
FINGERPRINTS - EPSON all models 48
PRINTER DUST COVER all models 19
MON-BASE Monitor Stands 19
COMPUTER PAPER all makes Low!!!
PRINTER STANDS Plexiglass 29-39
SURGE PROTECTORS \$Call

ATARI C-64

ACCESSORIES low, low CALL!!
C-64 CARDCO + G 99
ATARI MP1150 94
APE FACE 69
GRAPPLER CD COMMODORE 99

QUADRAM 384K QUADBOARD

w/64K RAM **\$249**

AST \$229 SIX PAK PLUS

w/64K RAM **\$249**

WORDSTAR PRO PACK

• Wordstar • Star Index
• Correct Star • Mail Merge
only **\$295**

COGITO

10 MG HARD DISK
• 1/2 Hi Internal \$699
• Controllers
Card and Cables!

SHUGART

1/2 Hi-Drives \$119
IBM TM **\$219**
360Kb drvs.

DCC DISCOUNT COMPUTER CENTERS

an established mail order/retail distribution network

BUYER FRIENDLY TERMS! • DELIVERY We ship immediately! Most orders delivered within 5 days! Add 3% (15 min) for UPS shipping, handling, insurance. Calif residents add 6.5% sales tax. 2nd day UPS available at extra charge. • PAYMENT Visa, M.C. cashiers checks, money orders, personal checks accepted (Allow 10 business days for personal company checks to clear). WE NEVER CHARGE EXTRA FOR CREDIT CARDS! C.O.D.'s welcome (20% p.p. deposit) with cash, certified check or money order. • WARRANTY All items shipped are new, include FACTORY WARRANTY and are GUARANTEED TO WORK. DCC is an AUTHORIZED DEALER and SERVICE CENTER for most major brands. • RETURNS Must be accompanied by RMA number (supplied by DEALER) and may be subject to a 20% restocking fee. Prices and availability subject to change without notice. All items limited to stock on hand. • MAIL ORDER PRICES NOT VALID AT RETAIL OUTLETS DUE TO REGIONAL PRICING RESTRICTIONS. Minimum order \$50.

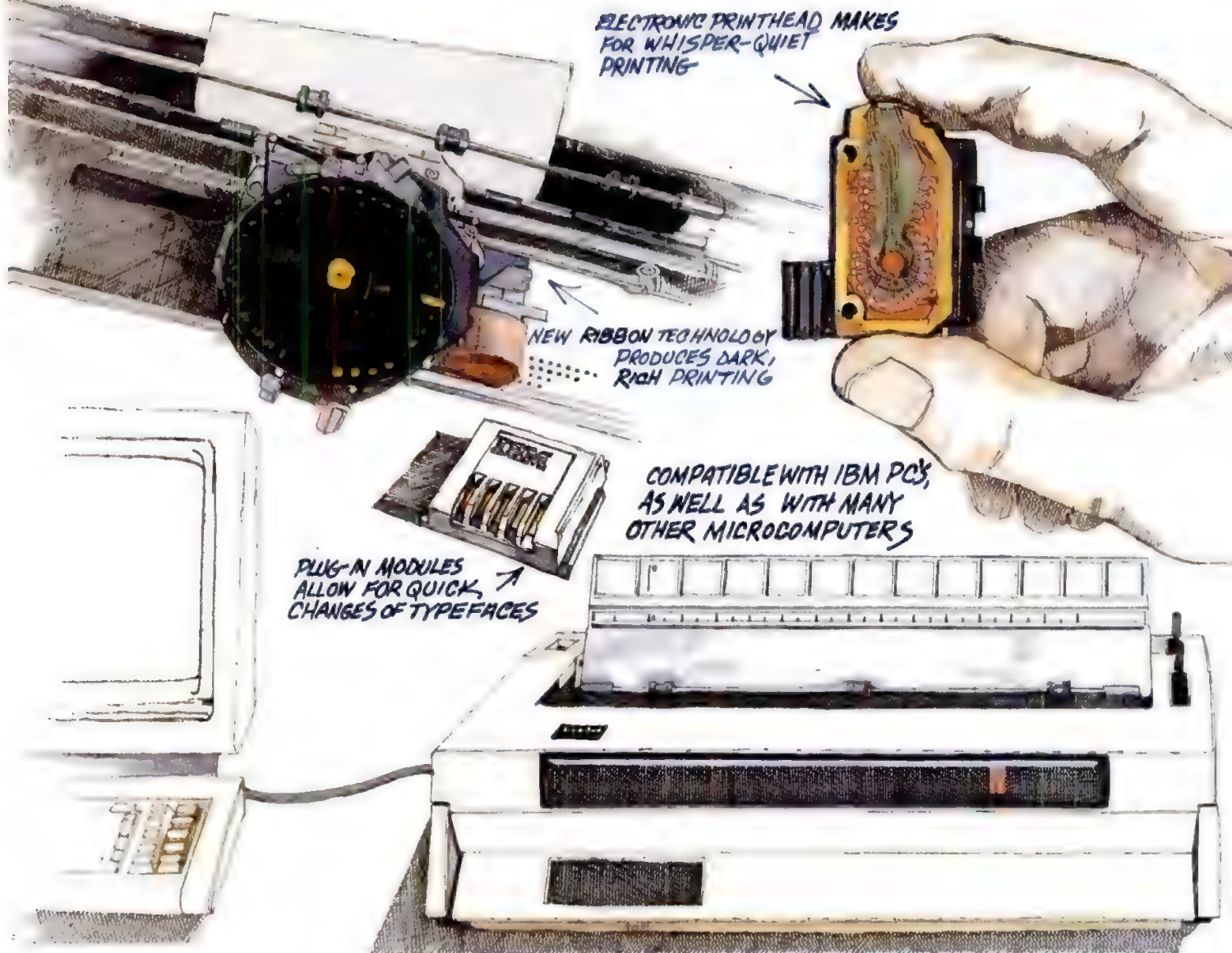
FREE - VISA/MC!



1707 S. BASCOM AVE • SAN JOSE, CA 95008 • (408) 559-6555
1243 W. EL CAMINO • SUNNYVALE, CA 94087 • (415) 965-4494
1341 FULTON AVE • SACRAMENTO, CA 95825 • (916) 971-3503

VISIT OUR DISCOUNT SHOWROOMS!

CIRCLE 117 ON READER SERVICE CARD



The new IBM Quietwriter® Printer. When letter quality should be seen and not heard.

If you're looking for a printer for your personal computer that offers quiet, letter-quality printing, look at—and listen to—the IBM “Quietwriter” Printer.

It's a technological breakthrough, featuring a new and innovative system for transferring ink to paper that makes it whisper-quiet.

But more than quiet, the “Quietwriter” Printer gives your letters the crispness of an IBM typewriter along with the deep, rich gloss of a carbon

ribbon. All at up to 60 quiet characters per second.

What's more, plug-in electronic modules support the full 252-character set of the IBM Personal Computer.

You can easily attach the “Quietwriter” Printer to IBM personal computers and to many other microcomputers.

The “Quietwriter” Printer is just one example of the more than 70 printer models we build. But they all serve a single purpose: To make your printing as effective as your

processing. To give your work the finishing touch.

Contact your IBM marketing representative or call 1 800 IBM-2468, Ext. 141/3T, for the IBM Product Center or authorized IBM dealer nearest you.

IBM

CIRCLE 162 ON READER SERVICE CARD

IBM PRINTERS

The Finishing Touch

**More power
to the
people that count...**

the all new Touchstone 2™

Entering numeric data into your PC is a very serious, very tedious business. Since a lot of this work is done by your fingers, doesn't it make sense to use a numeric keypad that was designed for the human hand?

Touchstone 2™ is a professional productivity tool for people who enter and revise numeric data...in spreadsheets, accounting systems, inventory control and similar applications.

Total one-hand control

The Touchstone 2 puts 53 key commands under the complete control of one hand. All of the most frequently used keys are accessible with a single touch, while a local shift key provides handy access to PgUp/PgDn, Tab Left/Right, ten standard F-keys, and other special control keys that you may need on an occasional basis.

Dedicated cursor and page controls

The cursor controls are always available right next to the number keys, and, at the touch of the local shift, they become page up and down, and tab left and right keys.

All your favorite keys in one place

Unshifted percent and brackets for speedy entry of compound math; space, backspace, home, end, alt,

ctrl, prt sc, and more; plus all ten standard function keys.

Even a place for your macros

To keep it compact, we couldn't include the whole alphabet, but Touchstone 2 does have A, B, and C to use as handy and easily-remembered hooks for user-defined keyboard macros.

Enter numbers twice as fast

Touchstone 2 data entry takes about 40% of the hand movement usually required with the standard PC keyboard. Even more important, it eliminates the need to look for each digit as it is entered.

Superior ergonomics

Low-profile design meets DIN specs; reduces fatigue. Number pad has side-mounted Enter and math keys that conform to the traditional calculator layout. Heavy-duty case is easily lap-portable, but won't slide around. Standard locating pip on 5 key helps keep fingers where they belong.

Reliable performance

The Touchstone 2 has its own unique microprocessor with 16-character buffer and patented Entry Error Elimination system. Next-key rollover feature ensures positive entry of every keystroke, even when a previous key has not been fully released.

Full-travel keyswitches are rated for 50 million cycles; provide quiet yet positive feedback. Contacts are covered by a protective membrane to guard against dirt, dust and accidental spills.

Touchstone 2: Built so well it carries a full one-year warranty and a 15-day unconditional guarantee.

A plug-in workmate for the IBM PC and many compatibles

Split cable and standard connectors allow you to use the Touchstone 2 alone or side-by-side with the main keyboard of your IBM PC or XT and many compatibles. Additional models available soon will be compatible with the IBM PC-AT, PC JR., and Compaq.

An investment in greater efficiency

The all-new Touchstone 2 takes the tedium out of number-crunching; lets you concentrate on more challenging work. The time you'll save will quickly return your small investment of \$199.95. Order by mail or phone for immediate shipment, or ask for it at leading computer and software stores.

**CALL TOLL FREE
1-800-828-6968**

In New York, dial 1-800-462-4891
International Calls 1-716-236-8358

To order by mail: Specify PC model number and payment by C.O.D., Visa, MasterCard, or check enclosed. Credit card customers include complete card number and expiration date. Add \$3.00 for shipping (\$4.50 for Canada). New York state residents add 7% sales tax. Dealer inquiries welcome.



TOUCHSTONE
TECHNOLOGY, INC.

955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624

CIRCLE 507 ON READER SERVICE CARD

posed to a hardware level, and many personal computers that aren't hard-core PC-compatibles do manage to be compatible on this level.

Getting our software to run on those BIOS-compatible computers is one important reason for having a screen driver that uses the BIOS services exclusively, but there's another important reason. We're starting to see new operating system environments and windowing systems, such as IBM's *TopView* and Digital Research's *Concurrent PC-DOS*, that work much better with programs that don't write straight to the screen but do use the BIOS services. It's relatively easy for them to intercept screen output that's routed through the BIOS. And once they do intercept the output, they can fit it neatly into the overall scheme of what's going on in the computer and its windows.

A final element makes using the BIOS services for screen output very attractive: our programs then have a much better guarantee that they will work fine on any new PCs and especially on any new display adapters, such as the Enhanced Graphics Adapter and the Professional Graphics Controller.

You might think the only way to go is simply to use only the IBM BIOS services and not bother with any other kind of screen driver. But there are good reasons for having the other two drivers as well. The ANSI driver extends our software to many thoroughly non-PC-compatible machines, which is worthwhile, although frankly, servicing non-PC-compatible machines is becoming less and less important as the PC rules the roost more and more.

Memory Driver

But what's the benefit of having a driver that writes straight to the screen memory? And then too, isn't there a risk of incompatibility with the PC as IBM brings out new display adapters that don't use the original PC-adapter display memory?

The main advantage of straight-to-the-screen memory output is simply that it works much faster than indirect methods. An efficient program's screen output appears much more briskly when the program writes that output directly into the display memory than if it is routed through the BIOS services. The differ-

The main advantage
of straight-to-
the-screen memory
output is simply
that it works much
faster than
indirect methods.

ence in performance is noticeable even when there's only a moderate amount of screen output and even on the PC AT (which you'd think was fast enough to make BIOS screen output seem instantaneous). If you're not running on an AT or if you're writing a full screen-load of information, the difference in performance is more than just noticeable—it's enough to make an entirely different impression on the user as to how hot a performer the software is.

Using direct memory output has another advantage besides speed: instantaneous presentation. No matter how long it takes our programs to create all the information we're showing on the display screen, the direct-to-memory technique makes it possible for it all to appear at once.

The technique is simple, and many good programs use it: as the screen information is created field by field, our programs can place it into a working copy of the display memory (located somewhere else in memory), instead of placing each field into the display memory. Once all the output information has been generated, the working copy can be moved into

the display screen's actual memory area with a single, very fast, assembly language instruction. The screen image appears truly instantaneously; this effect is very impressive. The oldest and newest versions of my utility programs (Versions 1.00 and 3.00) use this method. The impression they make on the user is far superior to my other versions, even though the working result turns out to be the same.

Addressing the Risks

Writing information straight to the screen memory seems like a risky proposition, though, because to do it we have to lock our programs into the well-known memory addresses the display adapter uses: hex B000 for the monochrome display adapter and B800 for the color graphics adapter. But other display adapters don't necessarily use these addresses, and IBM has long warned us against using them.

However, so many important programs use these addresses that IBM has taken the trouble either to use them or to simulate them in each new display adapter it has introduced. This holds as true for the PCjr as it is for the new Enhanced Graphics and Professional Graphics adapters.

Fortunately, IBM has not only decided for the moment to support these memory addresses for their recent work, it has officially stated that all future adapters will support the same addresses for the standard display modes. This little-known good news is actually important to software developers as well as users. It means that we can count on using these addresses and the advantages they bring for the entire life of the PC family of computers. And that's very good news to us all.

Stay tuned for the next issue's column. We'll look at some of the pragmatic, technical details involved in using both the BIOS and the memory driver. We'll also go over a few tips on *TopView* compatibility. ■

Don't buy a spreadsheet

A lot of electronic spreadsheets just can't cover your needs. They don't go far enough.

They're unable to work like you or adapt to the way you think.

Time for Microsoft® Multiplan®, the high energy spread. A spreadsheet with more workspace than the other leading spread. Full of high performance capabilities for your IBM® PC, PC XT, PC jr. or other MS™-DOS microcomputer.



Multiplan loves you as you are.

Other spreadsheets force you to learn how they think. Multiplan learns how you think. It remembers the way you work. Anticipates frequent commands. Even offers suggestions on spreadsheet set-up.

Commands are in English. So are formulas. Instead of typing mysterious coordinates like H54-L73=BK154, you can simply name worksheet areas: Sales - Costs = Profit.

that spreads too thin.

Multiplan can link information in different spreadsheets. When you make a change on one, every related one is changed.

Multiplan has optional Multiplan Application Programs that work with you to design and build custom spreadsheets for Budget Analysis, Financial Statement Analysis or Cash Planning in minutes. Not hours. Or days.

The trained mouse.

Multiplan has an optional Mouse. A handy little critter that flies through Multiplan so easily you barely have to lift a finger to select and execute commands. Small wonder Microsoft gets more performance out of a spreadsheet. We designed **MICROSOFT** the MS-DOS operating system that tells the IBM PC how to think. And our BASIC is the language spoken by nine out of ten microcomputers worldwide.

To get the best spread call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer. Now featuring Multiplan at a reduced price: **\$195.**

Suggested list price shown for Multiplan.

Microsoft and Multiplan are registered trademarks and MS is a trademark of Microsoft Corporation
IBM is a registered trademark of International Business Machines Corporation



SPOTLIGHT.TM MANAGER THAT

The SpotlightTM program offers a combination of online desktop accessories unmatched by any other organizer. Six accessories, all with exclusive capabilities, make Spotlight the single most effective business tool that businesspeople can use to organize their workday.

Better yet, Spotlight takes only 10 minutes to learn. Just a keystroke suspends your application program, giving you a window into Spotlight. Another keystroke brings you back to where you were just as quickly. It's that easy.

Spotlight a window to your workday.

Spotlight's full-color, easy-to-read windows organize all your business tasks in no time.

The screenshot shows the Spotlight Manager interface with a green background and a blue border. The menu bar at the top includes: Calendar, Weekly, Today, Insert, Delete, Recall, Alarm, Note, Options, MxWkly, Print, File, and Quit. The main display area shows the date "Monday, January 14, 1985" and the title "Do Expense Reports". A vertical timeline on the left lists times from 9:00a to 3:30. Appointments are listed with their times and descriptions: 9:00a - 9:45 Meeting with Bob, re: Sales; 10:00 - 11:30 Weekly staff meeting; 11:40 Call Bill about order #12895; 12:00p - 1:00 Lunch with Karen; 1:00 - 3:30 Product managers meeting; and 2:30 - 5:00 Sales reps briefing. At the bottom, the "Appointment Book" window shows the date "1-14-85" and time "10:39a".

Shows a monthly calendar at your request.

Audible alarm signals appointments, no matter what program you're using.

Schedule standing weekly meetings for automatic posting to your daily schedule.

Schedule meetings in 15, 30, or 60 minute increments.

Alerts you to overlapping meetings.

Names accessory in use.

Print all or part of your schedule.

Customize the format of your Appointment Book.

Make a note for the day.

Standing weekly meetings are shown differently from scheduled meetings.

The current date and time always in sight.

THE DESKTOP MEANS BUSINESS.

Check before you buy.
Only Spotlight has accessory combinations that work this hard.

	APPOINTMENT BOOK Only Spotlight shows you overlapping meetings and sounds an alarm to remind you of important times in your day. Schedules up to 90 appointments a day. Customizes your schedule format. And lets you print out all or part of your schedule.
	DOS FILER Only Spotlight lets you perform DOS tasks without knowing DOS commands. Formats disks without interrupting your work. Copies, renames files, and makes new directories. Sorts and searches through files and directories.
	PHONE BOOK Only Spotlight's autodialer adds long distance access codes as needed. Quickly finds a number from up to 18,000 automatically sorted phone listings. Includes extra room for addresses. Accurately sorts international characters.
	NOTEPAD Only Spotlight lets you call up a notepad, jot down information, and automatically file up to eight pages of notes to use in another program. Edit your notes and print them out as needed.
	INDEX CARD FILE Only Spotlight lets you create a mini-database of information. Stores up to 36 different categories of information with 500 information cards in each. Perfect for client lists, inventory, or part numbers.
	CALCULATOR Only Spotlight solves math problems with a 12-digit business calculator. Provides a visual map to your keyboard. And lets you instantly paste answers back into the program you're using.

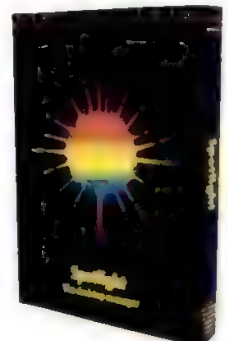
Spotlight runs with every major program for the IBM® PC, XT™, or AT™. With this kind of productivity and control at your fingertips, Spotlight is truly a businessperson's tool, not just another software gimmick.

Stop by your nearest computer dealer and ask to see Spotlight, the desktop manager that means business.

System requirements: IBM® PC, XT™, or AT™ or COMPAQ® portable computers, one disk drive, 75K memory for RAM resident portion, DOS 2.0 or higher. Printer optional. Can be installed on hard disk. Runs with most IBM PC software.

Spotlight
By Software Arts™

27 Mica Lane, Wellesley, Massachusetts 02181



**Sooner or
later, you'll have
to face
this computer
problem.**

PC MAGAZINE • MAY 15, 1984

Do your eyes itch, burn, or tear? Are they tired and sore? Do you get headaches, occasional dizziness, or blurred or double vision? If you have any of these symptoms, you're probably suffering from eyestrain and fatigue, and it may be from using your PC.

Eye fatigue and other vision problems are common for regular users of PCs and other kinds of video computer displays. This visual stress can also contribute to general tension and tiredness. Fortunately, the vision problems experienced by video display users have

Better sooner.

Better Sooner.

Computers don't ever get headaches.

But the people who use computers do.

Quite clearly, as PC Magazine spells out, that's not the only trouble they're having.

In case you're tempted to dismiss this as trivial, there are two things you should be aware of:

First, more than twenty states are already preparing legislation to force some improvements.

Second, if computer users suffer, so does business.

Because computers are only as fast and accurate as the people who operate them.

You are not a machine.

Computers are designed by engineers.

They usually know a lot about technology but very little about people.

Which is why so many computers are technically impressive but strangely unnatural to use.

Computer-induced problems (%)

Eye strain	55%
Back pain	43%
Headaches	30%
Shoulder	25%
Hand/wrist	18%
Neck pain	15%

(Source: "Ergonomic Principles in Office Automation" Pub. 1983 by E.I.S. AB, Sweden.)

Ericsson, in its very Swedish way, has always believed that excellent ergonomic design isn't a privilege.

It's a right.

That it isn't a noble gesture but demon-

strably good for business.

It's an attitude that has made Ericsson No. 1 in Europe twice over:

First, as the giant of European telecommunications.

Then again as Europe's biggest workstation company by far.

(You couldn't ask for a better marriage of technology for the future.)

Here is one example of how they got there.

It's the first of a whole range of computers to be introduced in the U.S.A.

The Ericsson P.C. It's Ergo-Intelligent.™

Ericsson has spent \$300 million finding ways to make people and computers work better together.

Here are some of the results.

Ergo-Screen.™

Aspirin gets rid of a headache. Ergonomics gets rid of the cause.

The Ericsson PC monitor has a non-glare screen.

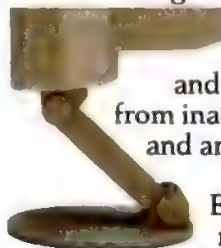
With restful amber characters on a specially developed, low-fatigue background color.

Even the shape of the actual characters was specially developed to allow easier recognition of difficult to distinguish letters like O and Q.

On the monochrome monitor, the resolution is double that of IBM's, so clarity is remarkable.

You can even have characters and graphics on the same screen.

Ergo-Arm.™



Thousands of people get neck and muscle pain from inadequate height and angle adjustment.

The Ericsson Ergo-Arm lets you move your screen exactly where you want it.

Better than back pain, wouldn't you agree?

Ergo-Touch.™

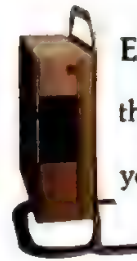
The keys are full-size and the layout is ergonomically planned for greater accuracy and speed.

Yet the keyboard is 20% more compact and less than half the weight of IBM's.

Even the cord is adjustable to suit left- or right-handers.

Ergo-Color.™

Even the color of the case is ergonomically selected to be restful to the eye over many hours.



Ergo-Space.™

The system unit is one-third smaller than IBM's.

It even fits under your desk in a vertical rack. So your desktop is your own again.

IBM Compatible.

Many companies claim to be compatible.

Some are. Some are stretching the truth.

The Ericsson PC boasts the highest compatibility rating there is.

It's operationally compatible.

You can take advantage of thousands of PC-compatible programs already available.

In fact, with the best-selling software, the program and data disks are interchangeable with those of the IBM PC.

Service. Not Excuses.

Ericsson wouldn't give you anything less than on-site or carry-in service. The choice is yours.

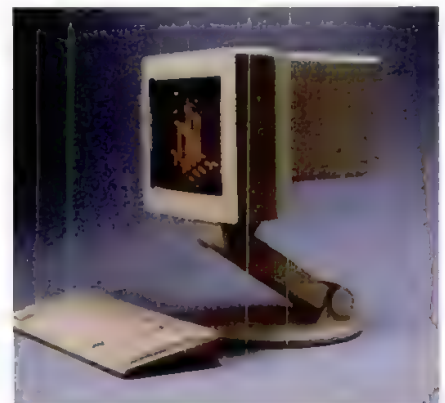
3 Free Offers.

Ericsson will send you revealing literature on ergonomics.

Also a detailed brochure on the Ericsson P.C.

And arrange a hands-on test if you ask for it.

Call toll-free 1-800-FOR-ERGO.



ERICSSON 

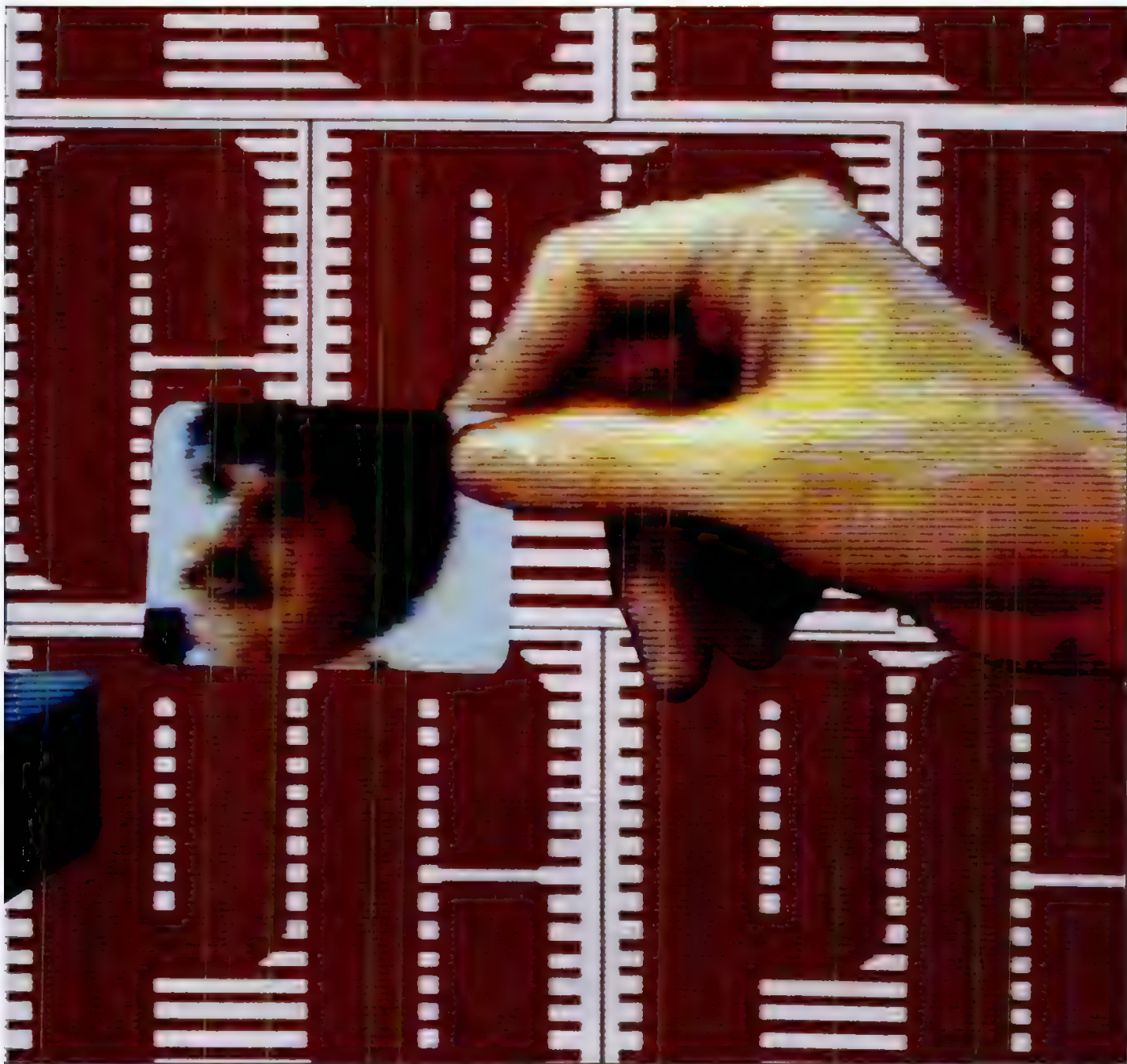
COVER STORY • GLENN A. HART AND JIM FORNEY

ADAPTED FOR

Third-party boards can enliven your video with more color, precision, and versatility—and banish that annoying flicker.



THE SCREEN



VIDEO ADAPTERS

Among the myriad IBM-compatible boards introduced by third-party manufacturers, one of the most popular categories is video boards. Unlike memory and I/O boards, which have a stultifying similarity, video adapters offer tremendous diversity in function and price. Color boards, especially, have proliferated almost like weeds. Each claims performance superior to the IBM color card, which isn't hard considering the limited resolution and color capacities of the Big Blue card and the horrible flickering caused by its cheap hardware design. Most such boards actually deliver what they claim, and even the simplest ones, which merely emulate the IBM exactly, are almost invariably a better choice than the IBM version (unless you want IBM to service your system).

Several color boards are available that offer higher resolution and/or more colors at a given resolution than IBM's standard. Perhaps the most popular is currently the Plantronics Color-Plus, which offers four colors at 640- by 200-pixel resolution (compared with IBM's white on black at

640 × 200) and 16 colors at 320 × 200 medium resolution. And it works perfectly with programs calling for a standard IBM color adapter.

The monochrome adapter alternatives have been much more limited, possibly because the IBM mono card is a far better performer than IBM's sickly color board. The IBM monochrome font is detailed, well designed, and easy on the eyes. The excellent IBM monochrome monitor is a fine choice for business and general use, although some users do not like the long-persistence phosphor and the resultant ghosting. A handful of combination boards that combine standard IBM mono and color modes have appeared. Boards like the Paradise Multi-Display card save one slot and a few dollars and work well within the limitations imposed by the IBM standards.

The first mono substitute to achieve significant sales has been the Hercules graphics board. This is a card that does everything the IBM mono card does, with one major enhancement—high-resolution graphics that can be displayed on the standard monochrome monitor. Compared with the IBM color card's "high" resolution of 640 × 200, the Hercules can dis-

play 720 × 348 on the mono monitor. Because mono monitors already have an inherently higher resolution than RGB color screens, adding a mono substitute board can give impressive results.

Unfortunately, there are a couple of hitches. The Hercules achieves its high resolution by using both the memory buffer originally designated by IBM for monochrome and the one designated for color display. Until recently, this design precluded adding any color board to a Hercules-equipped system. Without special provisions, a color card can't even be plugged into the bus without conflict. If no color is needed, there's no problem, but if an important program requires color, the Hercules owner may be out of luck.

The "may" part brings us to the second problem. The Hercules does not even attempt to emulate the IBM color standard; so color-oriented software that adheres to the normal IBM requirements definitely won't run on the Hercules or boards that emulate the Hercules. The software supplier must totally rewrite the programs to allow the Hercules to display graphics on the mono screen. While the Hercules has become popular enough to motivate a few system houses to create

COMPUTER/VIDEO ART FOR PC MAGAZINE

The art shown here was created by PC magazine's art director Gerard Kunkel in collaboration with Rob Cornet of Chorus Data Systems, Inc. First, they captured the image of a PC and erased a window for the computer screen (left). Next, a three-quarter view of Rob's face was captured and set inside the window (center). The third image, Gerard's hand, was silhouetted and put in position to hold the window image (right). In the final stage, the three images were combined and silhouetted, and a new background was inserted.



special Hercules versions (most notably Lotus's 1-2-3, Microsoft's Word word processor, and the excellent AutoCad drafting package), the list is still small compared to the number of programs that use standard IBM color protocols.

The Expanding Universe

The video adapter picture has become both more interesting and more confusing as new video cards have been introduced. The following series of articles examines a representative sample of the new boards and shows you what they can do. We've found it helpful to divide the new video boards into four broad categories.

One is combination boards that attempt to combine the best of both worlds—high-resolution graphics on a monochrome monitor and enhanced color modes on a color monitor. Such boards claim to offer improved performance, sometimes with cost savings as well, but a few sticky issues must be raised.

Combining high-resolution mono and high-resolution color is all well and good, but if the method is not compatible with off-the-shelf software, the improvements may well be meaningless in the real world. Supercolor modes that can be used only if

you program the output (a far from trivial task) may render the new contender useless. With so many boards and alternative methods appearing, it's simply impossible for software houses to modify their products for each new entrant. Only a few high-performance color adapters (primari-

Color boards, especially, have proliferated like weeds, and each claims performance superior to IBM's.

ly the Plantronics and Tecmar) have generated enough sales for any software support from independent software suppliers. In monochrome, only the Hercules is in this position.

In spite of this limitation, new hardware having no compatibility with any-

thing but the IBM standard continues to appear. The manufacturers with whom we have discussed this situation seem to suffer from the delusion that their hardware is so compellingly good that software suppliers will simply have to modify their programs to use the boards' idiosyncratic designs. Since software houses haven't done so for already well-established boards, it is unlikely they will for the more obscure boards.

Another problem with most of the new designs is that they don't allow both color and mono monitors to display simultaneously, even though their advertisements show two monitors happily radiating at the same time. One manufacturer suggested to us that this kind of advertisement was permissible "artistic license." We think not. Many users own both types of monitor, and simultaneous display may be important to them.

A related issue is whether both monitors can be connected at once. Several new designs have only one video connector, which obviously precludes hooking up two monitors. In other cases, the manufacturers suggest disconnecting whichever monitor is not being used in order to avoid synchronization problems and dam-



CONFIGURING A SAMPLE VIDEO CAPTURE SYSTEM

It took a lot of equipment to create the art for this article. The primary system included an IBM PC-XT with 512K RAM, an IBM monochrome and parallel printer adapter, and an IBM monochrome monitor. To this basic system Gerard Kunkel and I added the Chorus Data Systems PC-EYE 6-bit Video Capture System, which received its video input from a JVC GX-66U video camera equipped with a 12.5-75mm zoom lens. Initially, We viewed the actual video image on a Sony KX-1211HG composite monitor that was driven by a Chorus Data Systems Colorverter with external slide control. We manipulated the images with a Microsoft Mouse and viewed them on an Electrohome High Resolution Data Display that was driven by a Revolution Board from Number Nine Corporation. The applications software was IMiGIT, manufactured by Chorus Data Systems, in an IBM PC-DOS 2.1 environment.

—Michael O'Conne

VIDEO ADAPTERS

age to the monitor not in use.

Specialized and Advanced

Our second category of adapters is advanced monochrome boards that offer alternative text resolutions. Several products offer 132-column display in addition to the normal 80 columns. This parallels the distinction between 80 and 132 columns found in freestanding terminals used with non-PC computers. Since most wide-carriage printers produce 132-column printouts, a 132-column video display is useful in showing how wide hard copy will look. A 132-column display is also especially helpful with spreadsheets and database programs.

Two things to consider with 132-column displays are legibility and usability with normal software. Characters on a 132-column display are smaller than those displayed in 80-column mode; so the monitor must be sharper, or else the characters become difficult to decipher. The IBM monochrome monitor does a fine job of displaying 132 columns, as do some third-party monitors, but not every monitor is up to the job.

Even if the monitor can produce clean characters, some users may find the characters too small to read comfortably. The most common 132-character display mode has 44 lines of text, but some now offer 25- or 28-line displays to make each character somewhat larger.

Not all software will work with 132 columns, whatever the number of lines, while other programs won't allow more than the standard 25 lines. It is possible to patch some programs to accommodate the denser display formats, but many programs can't be modified or don't provide the information necessary to perform the patching.

Our third category of adapters is advanced color boards. This includes the more or less standard boards that offer more colors at a given resolution but also encompasses fascinating boards that offer unprecedented color performance. Several such cards make use of the new 400-pixel-

line monitors to produce seamless color graphics and high-resolution text that can approach the quality of a monochrome text display. Some even use the NEC 7220 graphics controller and associated graphics hardware to write their high-resolution graphics at much higher speeds than that at which software can generate graphics.

Compatibility is a major issue with

We had little trouble getting the products to perform as advertised—a testament to the consistency of IBM hardware design.

such boards. Some cards maintain compatibility with IBM color programs, but there are several others that do not. These boards require customized software or programming from scratch. We've examined a couple of boards like this, and they are impressive performers. But they may, in fact, be intended for original equipment manufacturers (OEMs) and developers who will integrate them into complete graphics systems, and not for the average PC buyer looking for a new video card.

Finally, a catch-all category includes some unusual products that defy other categorization. We've looked at boards that add on to a normal video card to produce subtle colorations on analog RGB monitors, freestanding graphics devices that can interface to any computer, and so on. One of the fascinating aspects of PC ownership is the wide spectrum of devices you can use, and even more interesting graphics devices will probably be introduced as

interest in graphics on the PC continues to build.

Using the Chart

The chart that accompanies this series is intended to help you evaluate whether a given board meets your needs. The Physical Characteristics section tells you if the card will need more than one precious expansion slot, what kinds of monitors can be connected, whether a light-pen interface is provided, and so on.

The Monochrome section indicates whether a board supports the 132-column mode and what kind of high-resolution mono graphics is available. Hercules compatibility, software compatibility, and other issues are indicated. The Color section indicates what kinds of displays are available in terms of resolution, the number of colors at a given resolution, software compatibility, and the like. The Other Features section indicates what add-ons, such as system memory (memory used by the CPU as part of its normal address space, *not* display memory), serial, parallel, and game ports, and so on, are provided as standard or optional features and what they cost.

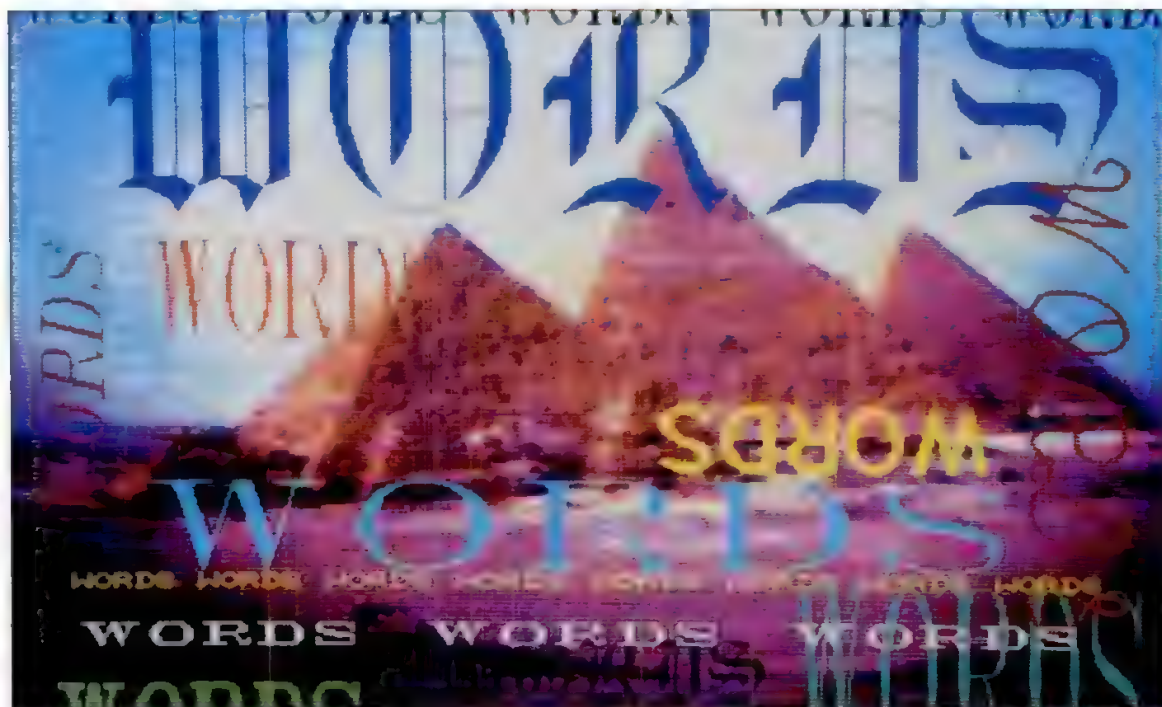
Finally, the Performance section summarizes what we found in our tests. Since it's very difficult to capsule the performance of complex products like these in a chart, you should rely on the text report on each product for the details.

Evaluating so many video boards has been an interesting and challenging task. While we found many similarities, we also were fascinated by the diversity of design and function. We had surprisingly little trouble getting the products to perform as advertised—a testament to the consistency of the IBM hardware design.

This is an exciting time in the micro-computer graphics field. Both hardware and software are advancing at a rapid pace. More detailed, faster, and more capable graphics are a certainty. As always, the beneficiary will be you—the user. ■

This video board beauty contest features 25 contestants: Some are good, some bad, and some are just plain ugly.

VIDEO BOARD REVIEWS



VIDEO BOARDS

AMDEK MULTIPLE ADAPTER INTERFACE

Amdek's MAI (Multiple Adapter Interface) board tries to be an "all-things-to-all-people" universal monitor card. In some ways, it does so rather handily, but in other areas, I was disappointed. It supports creation of up to eight pages of text storage on both high-resolution (640 × 400 pixel) color monitors and monochrome monitors. It also provides a parallel printer port and a high-resolution light-pen interface.

User Memory—for Some

The MAI card has an erasable UV PROM to allow for easy modification of character sets for special applications or languages. It also has 128K of on-board RAM, part of which is reserved at all times for board functions. However, if the RAM sockets on your system board are fully populated, you can map off up to 96K as user RAM, depending on your application and the DIP (dual in-line package) switch settings.

Unfortunately, through no fault of Amdek's, that's sort of a "Catch 22," because the person who needs that extra memory most likely has only 64K or 128K on the system board, in which case the board's user memory is inaccessible. And by the time a user loads the system up to 256K (less on earlier PC system boards), the board's extra 96K isn't going to be nearly as important.

Then, if you do use the available RAM to add to what you have in your system, you reduce the size of the video buffer and the number of pages (screens) you can access for graphics.

Perhaps my biggest disappointment with the MAI board came when I used it for text editing with a high-resolution IBM

screen. Amdek's own monochrome monitors are not high resolution, and this board failed to take advantage of the higher resolution offered by the IBM monitor. The MAI board would not, for instance, resolve a monochrome separation test pattern that all the other boards I tested handled without much difficulty. And that group included both strictly monochrome boards and combination types operated in the mono mode.

Character Defects

While for the most part, one character set looks pretty much like another, there are some notable exceptions here, especially with the *m* and *w* characters. The lowercase *m*, in particular, is rather poorly formed, with the middle leg trailing off to nothing before it gets to the bottom. This leaves you with sort of a lump at the top of the *m*; the bottom of the *w* has the same kind of lump. To make matters worse, these lumps seem to jump out at you, noticeably brighter than the good parts.

Scrolling with the MAI board was fairly smooth, and its performance with an RGB monitor was satisfactory. But because it doesn't do anything special that IBM's own card doesn't, and because of the lower resolution, I consider the Amdek to be the bottom-of-the-line card out of those I reviewed.—J.F.

AST MONO- GRAPHPLUS

IBM's monochrome card doesn't do graphics, and that's one of the best reasons not to buy it. The new MonoGraphPlus from AST handles the graphics nicely while also providing a parallel port for your printer plus an onboard clock/calendar. And it's easy to use. As soon as you plug it into an expan-

sion slot, attach your monochrome monitor, and power up, you're ready to go.

Near-Clone

Compatibility with Lotus's *1-2-3* seems to be the benchmark by which monochrome graphics cards are judged, and AST's new entry meets the test. To use any monitor card with *1-2-3*, you must

AST creates an extra line by stealing one row of pixels from the raster of each of the normal lines in text mode. Surprisingly, the loss of resolution is virtually imperceptible.

install an appropriate driver on your Lotus disk. Interestingly enough, however, there is no driver specific to the AST card. Instead, the instructions state, "Install the same Lotus *1-2-3* driver program on your Lotus disk as you would for a Hercules Graphics Card." So what we have in the AST card is an almost perfect Hercules look-alike, except for the on-board clock and calendar.

I found the AST board looking even more like a clone when I started trying it with software marketed specifically for Hercules. It even seems to run the Hercules Graph X package at least as well as the genuine article. But the MonoGraphPlus isn't strictly a clone, for, unlike the Hercules, the AST requires no software of any sort to configure it for graphics.

Everybody has to have a gimmick these days, and AST's is a character line added to the monitor screen. It's optional, and to

bring it up you have to use a program called NEWLINE.EXE from the disk that comes with the board. AST creates the extra line by stealing one row of pixels from the raster of each of the normal lines in the text mode. Surprisingly, the loss of resolution that results is virtually imperceptible.

But NEWLINE is AST's line, not yours. It sits at the bottom of the screen and tells you the current default drive and path, the current status of the CapsLock, NumLock, and ScrollLock keys, and the time of day. I didn't find this feature to be much of a plus.

Bonus Lines

However, the AST MonoGraphPlus *Technical Reference Manual* that comes with the board tells you how to call up a 26th and even a 27th line of your very own by reprogramming the CRT controller. A simple program added to the disk could have unlocked those lines for any user, but none is included.

There's really nothing new involved in adding the 26th and 27th lines. The choice has been there for the taking—or should I say the programming—all along. In fact, AST's NEWLINE program will bring up a 26th screen line on a Hercules card. The program isn't entirely compatible with the Hercules (part of the extra line repeated at the top of the screen, garbling part of the regular text in that location), but it proves the point.

The AST MonoGraphPlus board's built-in clock/calendar tells DOS the time and date whenever you boot your system. It's a nice feature and is standard on several of AST's other boards as well. While the clock/calendar circuit is probably the same as on earlier boards, AST has changed the software, combining two programs into one with a saving of less than 100 bytes. Both sets of software seem to work.

When it comes to the things that are really important when you're buying a strictly monochrome board like this—the quality of the graphics and the character

set for text—the new AST MonoGraphPlus is a top-notch performer that looks like it's going to be hard to beat.—J.F.

COLORMAX MULTI DISPLAY

The Colormax is a multipurpose video display adapter that can perform the same functions as both a standard IBM monochrome adapter and an IBM color adapter. It also claims to be able to display graphics generated with the normal IBM color card on a monochrome monitor and includes an IBM-compatible parallel printer port.

Three groups of jumpers must be set to adjust the board to the user's configuration. The slightly cutesy manual explains the settings clearly. The Colormax can drive an IBM-type mono monitor, an RGB color monitor, or both; it can also handle a composite monitor. The board itself is not full-length, but neither is it short enough to fit the short slot in the PC-XT.

Black Snow

I tested the Colormax connected to both an IBM monochrome monitor and a Princeton Graphics HX-12 RGB color monitor. The monochrome display emulated the normal IBM mono display with no problems. Some black snow was visible in screens with reverse video, indicating that the hardware design does not include the special provisions necessary to avoid this effect. Scrolling speed was the same as with an IBM card, or perhaps a tad faster.

Micromax does not provide any software with the card but does include two short BASIC programs that can be used for switching between mono and color. These programs work well, except that once the board has been switched to color mode, the act of leaving BASIC seems to return

the system to the mono mode.

Flicker and Roll

Color display was fine and behaved much like an IBM color adapter without the annoying flicker. In color mode, the monochrome monitor rolled vertically and was unreadable. Micromax instructs the user to adjust the vertical hold to eliminate the problem, but neither the Princeton Graphics MAX-12 nor an IBM monochrome monitor has a vertical hold control accessible to the user. I have heard an unconfirmed report that color-mode displays do not work with all monochrome monitors and are difficult to engineer because of the different scan rates used in mono and color monitors, so this could be the problem as well. In any event, it was not possible for me to get a usable display of color graphics or text on either an IBM monochrome monitor or a Princeton Graphics MAX-12 amber monitor.

The Colormax switches between monitors automatically if the application software calls for this switching. For example, 1-2-3 displayed text on the mono screen and graphics on the color monitor when installed with the "both" drivers. The graphics were also visible on the mono screen, but with the vertical roll mentioned above.

The parallel printer port worked well. The Colormax automatically switches the port address between LPT1: when the board is in mono mode and LPT2: when it is in color mode. This mirrors the standard addressing used by IBM and is handy when another video adapter is used with the Colormax.

The Colormax does serve well as both a monochrome and a color adapter. I cannot be as sure that displaying color on the mono monitor can be made to work. Several competing cards (the popular Paradise MultiDisplay board, for example) do what the Colormax does except for attempting to display color output on a mono monitor, and the Colormax doesn't seem to offer any particular advantage.—G.A.H.

(continued)

DISCORTEx CX-1 COLOR TRANSFORMER

The CX-1 Color Transformer from Discortex Corporation is not a video adapter board. What, then, is it doing in this review series?

The Color Transformer is a short card that enhances the performance of any normal color video adapter. In a way, it is analogous to the piggyback cards that plug into some of the video boards that we've reviewed, but it works with any standard color card.

Most enhancement boards add display memory to allow higher resolution or more colors at a given resolution. The Color Transformer doesn't work that way. Instead, it gives you a palette of 262,144 colors!

Analog Answer

But doesn't an IBM-type RGB monitor have only eight colors in two intensities, for a total of 16 possibilities? Aren't these monitors Digital TTL (transistor-transistor logic) so the output levels are either on or off? Right on both counts. The catch to the Color Transformer is that it needs an analog RGB monitor. An analog monitor works very much like a regular IBM digital RGB, except that the color drive levels can be varied continuously. And the Color Transformer produces its astonishing palette by adjusting the output level of each of the three color guns to any of 64 levels, giving $64 \times 64 \times 64$ possible combinations.

The Color Transformer is installed in series with the normal color adapter. The output of the standard card is connected to the Color Transformer with a supplied short cable, and the analog RGB monitor is connected to the Discortex board. The Color Transformer's lookup table transforms the output of the color card, and

three high-speed, digital-to-analog converters generate the appropriate analog level to send to the analog monitor. Up to 16 colors can be displayed simultaneously if the normal color adapter is capable of generating that many colors.

I used a Plantronics Color Plus, a very appropriate choice for use with the Color Transformer. The monitor I used was a Sony CDP-1201, an excellent and beautifully styled high-resolution monitor capable of both digital and analog RGB.

Installing the Color Transformer required nothing more than plugging it in and making the connections to the color card already in the system and to the analog monitor. The system boots and runs normally, with the Color Transformer playing no part.

Activating the Color Transformer involves running some BASIC software provided by Discortex. The BASIC programs are very well commented and clearly indicate the simple programming necessary to set up and use the Color Transformer. A utility is supplied to generate, modify, store, and recall any of four distinct palettes. The manual clearly indicates how to disable the Color Transformer for normal operation, how to initialize the board, and how to use it. You can store palette sets on disk for future use, and you can BSAVE or BLOAD pictures. Discortex also supplied several sample pictures to test and demonstrate the system for this review.

Mellow Tones

The Color Transformer can produce some lovely colors never before seen on a normal IBM system. The demo software allows interactive adjustment of the level of each gun, and it is fun to play with the output levels to see the colors that can be created. The visual effect of changing one gun by only one level is subtle in most cases, but changing a gun's output by five or ten levels produces a color change that's quite noticeable. It's also easy to set up a good gray scale.

After setting up an unusual palette, I loaded Lotus's 1-2-3 to see if the new col-

ors would be retained. They were. Some other programs, however, ignored the new palette and used the standard IBM colors. The determining factor may be whether the software writes through BIOS or sends data directly to the video hardware, but this is only a guess. A user programming in BASIC or other high-level languages that can write directly to an output port will have no difficulty in using the Color Transformer.

The Color Transformer works exactly as claimed and is reasonably priced at only \$295. My real question is, Who will want the board and for what purpose? Discortex says the gradual changes in adjacent colors can add shading and realism to business graphics, and sometimes research and medical systems use gray scales and color gradations for quantitative image assessment. For these applications, the Color Transformer would be a significant enhancement. But the added cost of an analog monitor and the uncertainty of using the product with commercial software indicate that the Color Transformer is a rather specialized product. If you create your own software and either need or want a very wide spectrum of colors, the Color Transformer is a gem.—G.A.H.

EVEREX GRAPHICS EDGE

The video board that claims to offer more pure video functionality than any other tested is the Everex Graphics Edge. Everex claims complete Hercules and IBM compatibility in monochrome and Plantronics and IBM compatibility in color, all on one full-length normal card occupying one standard slot. For good measure, the card also has its own superextended color graphics mode with even more color selec-

tions at high-resolution than the Plantronics (a full 16-color palette at 640- by 200-pixel resolution), and a 132-column by 44-line, high-density monochrome text mode, too! A parallel port is thrown in for good measure, and the board costs only \$499 retail, less than the Hercules or the Plantronics alone!

Installation is a plug-in-and-go proposition in most situations. The board has five jumpers, but the factory settings are usually correct. The jumpers control several Wait-state options. The Wait states concern tradeoffs between speed of display and generation of so-called white snow or black snow and flicker. The black-snow effect is caused by interaction with the refresh rate of the dynamic memory used in the PC. White snow occurs only in the high-resolution Everex color mode because of the high bandwidth required by Everex extended graphics. There simply isn't enough time for the 64 bits of required information to register without the Wait state. Fortunately, the Wait state required to eliminate the annoying white snow affects only the Everex extended graphics color mode and doesn't slow down either IBM or Plantronics color; so it should be used in almost every installation.

Everex provides a table clearly spelling out the various combinations and the pros and cons of each. The documentation is clear enough for technically oriented users, but it may be tough sledding for the uninitiated. Some expansion chassis (like my Sigma) do not implement Wait states on their extension motherboards, and so the options available are more limited.

The rear edge of the board has two standard, nine-pin video connectors, one for an IBM-type monochrome monitor and one for an RGB color monitor. It also includes an RCA connector for composite video and a two-position switch marked "Color" and "Mono" to set the board's operating mode. A ribbon cable and an extra rear-panel insert are supplied for the parallel port.

Besides saving slots and offering many

options, the board is truly a delight to use. Standard monochrome performance is exactly like the IBM monochrome adapter (assuming no Wait states in the mono mode). The Hercules emulation is also perfect. Lotus's *1-2-3* and *AutoCad* worked perfectly. I also tested the newest release of Microsoft's *Word*, which offers Hercules owners the best of both video worlds. The excellent on-screen display of

The Everex does exactly what it says it will do with a minimum of fuss and bother and offers both Hercules-type and color graphics.

italics, superscripts and subscripts, and other niceties available on the color screen now display on mono monitors, but with the inherently superior text font of the mono mode. The Everex card handled *Word* just as a true Hercules card did. Even BASICH, the modified BASIC supplied with a Hercules board, performed as expected.

The 132-column by 44-line display can be used only with software that has been patched for such a dense display. PC-DOS and IBM BASICA do not allow the large display, but a patched version of *WordStar* worked fine. While the characters in 132-column mode obviously are smaller than normal, readability is excellent—far better than some high-cost, 132-column terminals I have worked with in the past. The 132-column mode would be handy for word processing of tables and special charts, but the real advantage of 132 columns would be with spreadsheets. Maybe Lotus, Sorcim, Microsoft, and the other

spreadsheet suppliers will make the necessary patch points public, or perhaps Everex can figure them out.

In the color mode, the Everex ran every program I could find that used the standard IBM color mode. Its performance was much like other IBM-compatible color boards; it was faster than IBM's board and avoided the annoying flicker. I own a Plantronics Color-Plus, and software designed specifically for that board also ran on the Everex with no problem.

Everex supplied a demo of its proprietary 16-color, high-resolution, extended graphics mode, and that was a knockout on my Princeton Graphics System color monitor. (An interesting by-product of the extended graphics mode is that the original version of Microsoft's *Flight Simulator*, the one that does *not* support RGB monitors, can display much more color if the Everex TEST16 demo is run first and interrupted during operation. Evidently, the Everex gets locked into its extended mode and *Flight Simulator* uses the extended color capabilities.)

Color in Green and White

Color-mode displays are also visible simultaneously on a connected IBM-type monochrome monitor. This allows a user who has only a mono monitor to run programs that use IBM color graphics. The color-mode display on the mono monitor occupies only about half of the mono screen but is otherwise excellent.

There are two methods of switching between monitors on systems with both color and monochrome monitors connected to the Everex. If the PC system board switch is set to indicate a color monitor and the two-position external switch on the Everex rear panel is set to Color, the system will wake up in the color mode and can be switched back and forth between color and monochrome with software provided by Everex. If you'd rather have your monitor wake up in mono, set the system board for a monochrome monitor and the Everex switch to Mono. Switching to color then requires issuing a command and

VIDEO BOARDS

manually moving the Everex switch. Remember to move the switch back to mono when the computer is restarted; otherwise, the system won't boot.

Programming the special 16-color extended graphics mode is quite a bit simpler than with the specialized color modes of some other boards, although it's still no garden party for a beginner. The Everex board has a full 64K of on-board RAM, which can be bank-switched in 16K segments to increase the available memory. You can even use the BASICA interpreter to write to each bank and switch between them by changing the value in a register. Some very impressive color video effects can be generated that way.

Finally, the parallel port worked normally as LPT1:. No provision is made to change the addressing of the parallel port (although a jumper can disable the port entirely), so users with other parallel ports in their systems may have to juggle addresses a bit. Fortunately, the parallel port on the video card is usually addressed at LPT1: in most systems, and so the Everex should not present any major problem for most users.

If you've gotten the impression I like the Everex Graphics Edge, you're right. It does exactly what it says it will do with a minimum of fuss and bother. It is one of the few setups that offers both Hercules-type monochrome graphics and color in one system.

I also like Everex's choices of Hercules and Plantronics as emulation models, since these are the most popular boards of their types, and some good software is available for the special modes. Everex's own superextended color graphics and the 132-column mode are potentially useful as well.

The fact that all this actually works and is priced at only \$499 is simply remarkable. It is difficult to contemplate anyone's buying a standard Hercules or Plantronics board when they could have the Everex for the same or less money than either competitor alone. I think Everex has a winner here.—G.A.H.

EVEREX GRAPHICS PACER

Slot space has always been at a premium in IBM Personal Computers. There are only five slots in a PC and eight in an XT (including three short slots that won't accept full-length plug-in cards). One slot is always occupied by the floppy disk controller, and hard disk users have to devote one to the controller for that device as well. Another also has to be allocated to whatever board is used to generate video for the display, and if both monochrome and color video are desired with standard IBM cards, one more slot disappears. The situation in many portable PCs is usually even worse, with fewer slots engineered into the cramped confines.

The innards of my test system looked lonely and empty with just the Graphics Pacer installed.

Add memory, parallel and/or serial input/output ports, a clock/calendar, a mouse interface, or any of the myriad other possible expansion functions, and the available slot count reaches zero very quickly. The memory-oriented multifunction cards help quite a bit, but expansion is like a gas—it fills the available volume immediately.

The new Graphics Pacer board from Everex Systems Inc. consolidates both video and floppy disk control on one full-length expansion board. The video is not just standard IBM-compatible mono-

chrome, either; it includes high-resolution monochrome graphics fully compatible with the Hercules design that has become an actual standard. This helpful amalgamation is enhanced further by the inclusion of a parallel printer port.

All this fits on a standard full-length single expansion card. The board is narrow, with no parts extending very far from the board, and so it should work well in XTs and other systems with narrow spacing between the card connectors.

Easy Pace

Installation is trivial. The only jumper to set determines if the floppy controller section is enabled (why anyone would buy this board and *not* use it as a floppy controller is beyond me). The preliminary documentation is sketchy and doesn't indicate which way to connect the supplied two-drive cable, but most floppy drives have pin 1 and pin 34 marked, as does the connector on the cable; so it isn't difficult to plug the cable in correctly. No changes to the floppy drives or their jumpers are required. The rear of the board has a 9-pin connector for a standard IBM-type monochrome monitor and a 25-pin connector for the parallel port. There are no switches to set other than the motherboard switch on the PC to tell the system a mono monitor is in use.

The test system booted normally with the Graphics Pacer in place; so the floppy control section worked as it should. I did not have any difficulty at all with floppy operation during the test period.

Video was equally trouble free. Normal DOS displays seemed a bit slower than with a standard mono card, but the difference was minor if it existed at all. The Graphics Pacer does not have the Wait-state provisions or requirements of Everex's Graphics Edge, and so perhaps some compromise was made in speed versus black-snow generation (see review of the Graphics Edge in this series).

Lotus's 1-2-3 worked perfectly when installed for a Hercules board, as did AutoCad, Microsofts Word, Framework, and

other programs capable of using the Hercules mode. As always, Hercules graphics were delightful—crisp and detailed.

The innards of my test system looked lonely and empty with just the Graphics Pacer installed. Both the graphics and the floppy disk control functions worked exactly as expected, as did the parallel printer port. There is no provision to change the address of the printer port to anything other than LPT1:, but this should not be a problem in a system likely to use a Graphics Pacer.

The Graphics Pacer board is easy to install and easy to use, and the Hercules graphics capability is, as always, highly desirable. Other boards offer various combinations of video and other functions, but the Graphics Pacer is a major contender at its price.—G.A.H.

HERCULES COLOR CARD

Right out of the box, the Hercules Color Card goes into an empty expansion slot, ready for you to plug in an RGB monitor (or a composite monitor via a plug-in adapter) and go to work—no jumpers, no software. For most applications, it's just that easy.

The Hercules Color Card is so nearly identical to the IBM Color/Graphics Card that it's almost uncanny. It can interface with light-pens compatible with the IBM board, and when I ran it with one rather snobbish system that won't work with just any old board, that system couldn't even tell the difference.

But the Hercules has the same shortcomings as the card it emulates. And certainly one of the worst of these is the flicker scrolling that plagues its Big Blue cousin. Both cards seem to manage scrolling through a block of system RAM rather than dedicated or even semidedicated on-board memory. Of course, that helps to

keep both the cost and the size of the board down.

Card Partnership

However, the way the Color/Graphics Card deals with the 64K of available video buffer should be good news to anyone who uses a Hercules Graphics card for high-resolution monochrome graphics but also needs a color card in the system. Unlike most other color cards that demand at least 32K of the available buffer space at all times, the Hercules Color card has been designed with a software switch that makes it stand aside and let its monochrome cousin have the whole 64K when necessary. Or it can share the buffer fifty-fifty when the mono card isn't hogging it. These two arrangements are in just about all of the software written for the IBM PC requiring high-resolution graphics. As a practical matter, it's the only color card that is fully compatible with the popular Hercules monochrome card.

And there's more good news in the size of the Hercules Color Card because, unlike the genuine IBM article, it is a half card and will fit a short slot like the one in the XT. Still, I had a problem fitting the Hercules board in my PC because the circuit board was about 3/32 longer than it should have been, which pushed the card-edge contact area too far forward to match up with the socket on the system board. It wouldn't go in the end slot at all, and only with some difficulty did I manage to force it into one of the inboard slots.

Port Pressure

Hercules has added a parallel port to its color card. However, as common as parallel ports are becoming on almost every conceivable kind of function card you can plug into a PC, another hard-wired port in your system can become a liability. My computer couldn't even *find* my regular parallel port a few times during this project when I had it configured to automatically take a back seat to any other port(s) in the system. DOS just won't accept LPT3;

and, in fact, the manual for the Hercules card warns of such possible port conflicts.

While you can do a lot of work with this card right out of the box—all the work that many of you would ever expect to do—some programming may be required to

There's more good news in the size of the Hercules Color Card because, unlike the genuine IBM article, it is a half card and will fit a short slot like the one in the XT.

adapt it to specialized applications. Roughly 85 percent of the manual is written "for advanced users," with appropriate memory address listings and hexadecimal codes to dig into if you like. However, most of that is a rehash of data readily available from IBM that would apply to virtually any color display card you might be using. I think Hercules might have done a little more by way of software support or documentation to help you explore some of the outer regions.

The Hercules Color Card comes in at less than half the suggested retail tag of some of the other boards I worked with. And if all you really need is a board to drive an RGB or composite monitor, do all the ordinary things a color card is supposed to do, and maybe double as a parallel port for your printer—or if you need full compatibility with a Hercules Graphics Card—this Hercules could be your champion.—J.F.

(continued)

VIDEO BOARDS

HERCULES GRAPHICS CARD

This is a story about the first board I almost bought. When I bought my PC, I almost bought the Hercules Graphics Card for the monochrome monitor. I didn't do it, because I could see the need for color looming large on the horizon. But since the Hercules board had many desirable features, I'm glad to have a chance to look at it again.

Basically, there's something kind of friendly about the Hercules Graphics Card. Just plug it in and go! The Hercules has no little jumpers you have to fiddle with to make sure they came properly configured from the factory. As soon as you get the DOS prompt and type a few characters, you know you are communicating with the monitor, and a quick Shift-PrtSc command confirms that it has found your printer (parallel) and the two of them apparently can live happily together.

At this point, you're not set up to make the card do graphics. But you are up and running for text. If your PC is new to you and you need to get acquainted with it before you do anything else, you can put IBM's monochrome system demo disk or many programs' demos right in and start having some fun.

That may seem to be an unnecessary point to make, but the truth is there are cards out there that either don't run these well, or don't run them at all without some special software. So there's a degree of compatibility here that not all monitor cards possess. And if your needs are not especially demanding, you may never have to read past page 5 of the manual for the Hercules Graphics Card to get your money's worth.

But the Hercules card will do a whole lot more, with three software-selectable modes available to the user on Hercules cards manufactured in the past year or so.

The lowest level is simply a text mode, and it is the default mode at boot up. The second mode is called "half"; in this mode, you can do graphics requiring up to 32K of system video buffer—half of the total 64K available.

Unlike earlier Hercules boards, those designed to be used with the HGC software are compatible with having an IBM or similar color card in either the default (diag) or "half" mode, sharing with that card whatever buffer space the system provides. The "full" mode, however, is a completely different story.

Board Brawl

If you need the full 64K of video buffer for high-resolution graphics applications such as CAD/CAM packages, you'd better not have a color card in one of your other slots. Not unless it's the new Hercules Color/Graphics Card, that is. Most color cards will fight like cats and dogs for their fair share of buffer and are likely to crash your system in the process. But now, Hercules has its own Color/Graphics card (renewed in this series), a paraclone for IBM's card that's designed to stand aside when the mono card needs the whole buffer, or take its fair share when that's allowed.

For graphics, the Hercules Graphics Card uses a special offshoot of BASIC called BASICH; I would have been happier to see it compatible with BASICA. A minor point, perhaps, but in this world of incompatibilities or not-quite compatibilities, anything that eases that burden is certainly appreciated.

One of the things I liked was a little brochure that came packed along with the card. It lists a wide variety of applications packages requiring graphics that you can be assured will run properly on a Hercules card. It's a little thing, and yet not so little considering the questions of compatibility that do come up. Hercules at least seems to think enough of its customers to try to give them some guidance in selecting software that will perform properly with the board. Some software won't, one of the more

notable exceptions being Microsoft's popular *Flight Simulator*.

When Hercules modified its board design, albeit slightly, one of the software niceties the company managed to throw in was a "screen saver." Tacked on to a software command, it automatically blanks your monitor to save the screen phosphors when there's been no activity for 5 minutes. It's a nice feature, and when you return to fire it up again, pressing any key puts the screen right back where you left off.

Mixed Blessing

I generally prefer a monitor card like the Hercules that doesn't require the user to set up a bunch of little jumpers or switches on the circuit board, and the newer Hercules boards have none. However, the lack of jumpers and DIP switches on the Hercules Graphics Card can be a mixed blessing. This is especially true when you start adding other accessory boards to your PC.

The parallel printer port is a case in point. DOS will not address more than two parallel ports in your system at once, and with many of the popular PC enhancement boards passing out parallel ports as freely as a politician kissing babies, you can find you have too many ports, and two of them are fighting with each other. To avoid possible conflicts, it's nice to be able to disable one or more of the ports right at the board; you'll have to disable something other than the Hercules if you have a conflict. That's a pretty minor consideration, though, and hardly a detraction from the board's overall appeal.

The Hercules Graphics Card was high on my list of possible purchases when I first bought my PC, and looking back, it might have been a better choice than what I started with. A number of new boards have come along since then, some offering a variety of added features. But for a fine, unpretentious, no-nonsense, strictly monochrome card with graphics capabilities, the Hercules is still a worthy contender.—J.F.

IDEAGRAPH COLOR GRAPHICS CARD

IDEAssociates is a high-end manufacturer of various multifunction, communications, peripheral control, and other cards for the IBM PC environment. While individuals can obtain the company's products, IDE's main focus is on system builders, OEMs, and value-added resellers.

The IDEAgraph color board is, therefore, designed for such knowledgeable system integrators rather than the average PC user. By the time an end user sees an IDEAgraph, it will have been integrated into whatever hardware/software system is being purchased and will be working correctly.

The reason for this preamble is that the IDEAgraph is probably the most flexible color card examined in this project. It is capable of driving normal RGBI digital color monitors, RGB analog monitors, composite monitors, and even IBM-type monochrome TTL monitors. The card is equally happy operating in either interlaced or noninterlaced mode. You can use it with normal or high-scan-rate monitors of up to $1,024 \times 1,024$ resolution, but it works just as well in the limited graphics modes usually seen on a PC. It is, however, not intended to replace a normal PC video adapter and is not compatible with programs written for the standard color adapter.

At a Price

All this flexibility exacts a high price. While installing the board is pretty much a plug-in-and-run proposition, some rather sophisticated software must be run to match the board to the monitor being used. Terms like *horizontal front porch* and other arcane phrases appear. The job is not for a novice, but, after all, it isn't intended to

be done by a beginner.

The IDEAgraph itself is a full-length single board of excellent construction. There are four connectors on the rear edge, for Green/Sync, Red, Blue, and the standard 9-pin connector for RGBI TTL monitors. The board is available with either 128K or 256K display memory and with either a 24-MHz or a 40-MHz clock crystal. There are even Genlock and other options that make the IDEAgraph suitable for broadcast applications such as creating weather maps and other graphics. The fantastic NEC 7220 graphics controller is used for super-high-speed operation.

Novel Colorations

The IDEAgraph's resolution and color display capabilities depend on how much memory is installed. With 128K, 16 colors can be displayed with up to 256K pixels, allowing 512×512 , $1,024 \times 256$, or 640×400 resolution; 4 colors can be shown in $1,024 \times 512$ or 720×720 resolution; or 2 colors can be used with $1,024 \times 1,024$ resolution. With the full 256K display memory, 256 colors can be displayed at 512×512 , up to 4 colors at $1,024 \times 1,024$! These color and resolution figures are way beyond what are normally seen in the PC environment. The higher resolutions require a long-persistence analog RGB monitor, but using the PC for such applications was unheard of before.

I tested the IDEAgraph with Princeton Graphics's SR-12 high-scan-rate and HX-12 standard RGBI monitors. The IDEA software is extremely flexible, allowing many operating parameters to be set. Barry Krieger of IDEA Engineering Group was both patient and helpful during this process. The standard HX-12 was no problem, but we did have to experiment a bit to get the SR-12 working well. While I was shipped a 40-MHz IDEAgraph, I changed the crystal to a spare 24 MHz I had on hand, because the reasonably primitive monitors were not fast enough to take advantage of the greater abilities of the 40-MHz unit.

Since both PGS monitors are digital

TTL, I was not able to display any more than 16 colors simultaneously, nor could I attempt the very high resolutions the IDEAgraph can produce. The IDEA software included some simple demo programs, which were impressive and ran fast thanks to the NEC 7220 and good hardware design. The IDEAgraph also offers a cross-hair cursor, text, and animation features. A library of graphics primitives written in C can be used to create sophisticated displays.

While it is clear that I couldn't (and didn't) test the IDEAgraph completely without the appropriate monitor, I was quite impressed with what I did see. All displays were crisp and clean, with absolutely no evidence of flicker or glitches. The documentation was detailed, the IDEA support group helpful and friendly. While there is little reason for the average PC owner to buy an IDEAgraph unless specific software calls for the board, if I were an OEM I would give serious consideration to the IDEAgraph.—G.A.H.

INNOVATION COLOR GRAPHICS/ PRINTER ADAPTER

What can I say about a color adapter that imitates the IBM color adapter card? While the INNOVATION Color Graphics/Printer Adapter offers a couple of nice additions to the standard IBM color card, it also imitates the worst feature of the IBM card—the annoying and inexcusable flicker during scrolling.

The nice features, both of which work well, are the inclusion of a parallel printer port that is fully addressable as LPT1:,

VIDEO BOARDS

LPT2:, or LPT3:, and a single-dot font that is sharper than the normal double-dot font originally designed for color television rather than monitor displays. The terse and unfriendly documentation explains how to set the onboard jumpers before plugging the board in. Connectors for a light-pen and RF modulator are supplied as well.

But why the horrible flicker? Any number of IBM-compatible color boards, even inexpensive ones, have eliminated the problem. The board appears to be reasonably well built and has a low chip count, which tends to suggest reliable operation. I doubt that anyone would buy this board, however, especially after they've seen a color display that does not have the INNOVATION's flicker.—G.A.H.

MA SYSTEMS PC PEACOCK

The PC Peacock is yet another imitator of the IBM color card. It includes a standard parallel printer port and can display a single-dot character font as an alternative to the IBM double-dot format, but otherwise it does nothing an IBM card or any number of other cards can't do.

To make matters worse, the PC Peacock also shows the egregious flicker that plagues the IBM color card. I have already railed against this problem in other reviews in this series, so I won't here. Suffice it to say that the flicker is annoying and inexcusable.

The PC Peacock is a thick, double board with an integral piggyback board as part of the basic circuitry. It may be too wide to fit motherboards with narrow spacing or those in many portable compatibles. The chip count is large, which would tend to indicate less reliability in the long run. Why so many chips are necessary to perform functions available on

much smaller, competing boards is difficult to understand. Perhaps the board was designed some time ago, before circuits to emulate the IBM color board were as advanced as current parts allow.

Another problem with the PC Peacock surfaced when the COLORBAR BASIC program supplied with DOS was run. While all the colors were displayed correctly, bright lines of flickering dots appeared in several areas of the screen. These were not visible during normal program listings or other text displays. This problem probably indicates some faulty memory on the board.

The parallel port is addressable, and the single-dot font is desirable, too. The documentation is quite good. But the double board design, chip count, and flicker suggest that a seeker after a straightforward color adapter might be better off looking elsewhere.—G.A.H.

PARADISE MODULAR GRAPHICS CARD

Paradise Systems has introduced a new monitor card called the Modular Graphics Card, and although I got off to a rather bad start with it, once I got it up and running I found it to be an outstanding performer in some respects and good, at least, in most. A rather modestly priced card, its performance as a monochrome graphics board stands out because of the range of shades of green it will produce between bright and blank. And full screen, at that. It also has about the smoothest flicker-free scrolling I've seen.

The modular part of the name has to do with expansion capabilities built into the basic board. It's designed to carry two piggyback add-ons. These include such

options as a clock and additional RAM. I like the idea because you can add the options you want or need without using additional expansion slots.

When you use this as a mono card, you start out after every boot with a scrambled screen until you run some software to reinstall it. That can be incorporated in an AUTOEXEC.BAT file to bring it up and running automatically every time you boot. But the first card I had defied every effort, including a couple of phone conversations with technical types at Paradise, and never did give me a usable monochrome screen.

A replacement was quickly sent to me, and it wouldn't come up as a mono card either. While I had no other monitor card in the system at the time, I did have a couple of other cards in the box that shouldn't have had any effect on it. But on the off chance that there was some interference, I stripped the box down to nothing but the system board, the disk controller, and the Paradise board. Suddenly the Modular Graphics Card worked perfectly.

The question then was which of my other boards was the culprit. So I put them back, one at a time, waiting for one to crash the Paradise board. None did. I tried the Paradise board in each of the expansion slots and it worked; before, neither it nor its predecessor had worked in any slot. I tried to get the original board back for another try, but it had already been returned. And I have not been able to duplicate the problem again.

Without a Clue

The manual cautions against trying to use the Paradise Modular Graphics Card as a monochrome card with any color/graphics card in the system. But it doesn't rule out using it as a color/graphics card with some other card managing a monochrome display. It can be done, I found, without any clues from the documentation, by setting the system board switches the way you would for any dual-monitor combination. Still, the fact that this Para-

EVEREX

EVER for EXcellence

132 Cols × 44 Rows +
Simultaneous Color
and Monochrome
Graphics Display +
One Card/
Single Slot =

The Graphics Edge™



The **GRAPHICS EDGE** is the leading edge. We've really pushed technology to the limit with this one, and here's why:

- it is software switchable from 80 cols x 25 rows to 132 cols x 44 rows, making it ideal for spreadsheet applications,
- drives both a color and a monochrome monitor **SIMULTANEOUSLY** and prints this same information in color on your color printer. Ideal for business applications involving heavy word processing combined with color graphics requirements,
- and runs **Lotus 1-2-3™** with **FULL GRAPHICS** and also **Microsoft Flight Simulator™** on either high-resolution **IBM®** Monochrome or color monitors.

And if that's not enough, there's more:

- it is **Fully Compatible** with IBM Monochrome and color adapters, Colorplus™ and Hercules™

- will run all **IBM Color Graphics Software** on the **IBM Monochrome Display**, opening to you a wealth of IBM Color Graphics software applications,
 - supports all **BASICA** graphics commands on IBM Monochrome or color monitor without software patches,
 - 640H × 200V in 16 colors,
 - 16 shades of green in green monitors with composite output; and...
- one printer port and one light pen interface.

No Other Card can give you So Much for So Little. At a Suggested retail price of \$499, you and your IBM PC will be performing to the fullest potential. **WHAT ARE YOU WAITING FOR!!!**

OEM Inquiries Welcomed.

For more information, contact your nearest dealer.
OEM and Dealer Hotline 800-821-0806.

In California call 800-821-0807.

Microsoft Flight Simulator is a trademark of Microsoft Corp.
IBM is a registered trademark of International Business Machines Corporation.
Lotus 1-2-3 is a trademark of LOTUS Development Corporation.
Colorplus is a trademark of Plantronics.
Hercules is a trademark of Hercules Computer Technology.
Graphics Edge is a trademark of Everex Systems, Inc.



Everex Systems, Inc.

CIRCLE 164 ON READER SERVICE CARD

891 Maude Ave., Mountain View, California 94043 (415) 967-1495

Price subject to change without notice

AD-101

VIDEO BOARDS

dise board can do monochrome only as a solo is a distinct drawback.

Nor was I pleased by its performance as a mono board teamed up with an IBM green screen for text work. It didn't like my favorite word processing software and did strange things with the cursor. With other boards, the word processor changes the cursor in distinctive ways to signal if the NumLock or CapsLock is on and which text entry mode I've set with the Scroll Lock. The only distinctive thing the Modular Graphics Card did to the cursor was hide it if I accidentally hit the NumLock. Of course, that's only one applications package; the card seemed to work just fine with others I tried.

While most of the character set the Modular Graphics Card produces is pretty standard and easy to read for text work, there are some peculiarities. The most obvious is the middle leg of the lowercase *m*, which is slimmed down to a single row of dots. This is a result of Paradise's choosing to use a narrower dot matrix (8 × 14 rather than 9 × 14) for the character set. Overall, the new Paradise Modular Graphics Card gets a mixed review.—J.F.

PARADISE MULTI DISPLAY CARD

The Paradise Multi Display Card is easy to love. It installs easily, with well-illustrated documentation that can guide a neophyte through the trauma of opening up his or her PC for the first time. There is one on-board jumper block and a block of DIP switches, but both are big enough to be obvious and easily identified right up at the top of the daughterboard that completely overlays the main card.

You can't really go wrong without trying, and once you plug in your monitor(s) and boot the system, you're up and run-

If you're on a limited budget, the Multi Display Card is a good choice as your first monitor card.

ning. There's no limbo time while it waits for software installation. You will have to do some programming before you can access all the features this board supports. But you can do a lot of work without having to give software a second thought.

As a monochrome board, the Multi Display Card puts out a very nice, quite IBM-like character set that's easy on the eyes and easy to work with for long periods on an IBM green screen. It doesn't do characters any better than anyone else's board, but just-as-good suits me fine.

And while not a thing of beauty, a full, 80-character line mode called up on a decent color monitor yields text that isn't at all bad. Although obviously no match for a high-resolution mono screen, it's about on par with the competition.

The Multi Display Card really shines when it's doing what it was designed to do: handling both a monochrome and a color or composite monitor while taking up just one of your precious expansion slots. If you're just starting out and configuring a system on a limited but not stingy budget, this card is a good choice as your first monitor card instead of either of the possible genuine IBM alternatives.

A Switch Hitter

It can operate only one monitor at a time, and so if you need both displays simultaneously for any reason, you'll still have to buy a second card. But for many applications, a single Multi Display Card should suffice even when you do add that second monitor. It can automatically switch back and forth between mono and color monitors to give you access to all the

features of software like Lotus's 1-2-3. Or you can switch back and forth between the two from the keyboard. With recent DOS releases—2.0 and later—you can do it with a MODE command. However, the manual provides listings for short programs that will accomplish the same thing; you can set them up so that a single keystroke will make the switch.

If you choose to put a second monitor card in your system, the Multi Display Card is nice because it can assume the King Color role alongside someone else's mono board or play second fiddle to another color/graphics card.

Seconds Count

Unlike running with two monitor cards—where software switching times between mono and color are barely noticeable—there's a significant time lag with the Multi Display Card. It's especially apparent when going from color to mono; 3 seconds elapse before there's a usable screen image. Going from mono to color, the time is reduced to about 1 second, which I could certainly live with.

My only complaints are that I wish Paradise had made the parallel printer port optional and put a plug-on connector on the ribbon wire rather than soldering it to the board. Despite those minor gripes, the Paradise Multi Display Card is at the top of my list of choices.—J.F.

PERSYST BOB COLOR ADAPTER

BoB stands for "Best of Both," Persyst's claim that the BoB board provides the best of monochrome and color graphics display on one monitor. As we shall see, the BoB board does offer a measure of both video disciplines, but with some tradeoffs, as might be expected.

The BoB board itself is a full-length,

single card that you plug in to install. The only jumpers on the board control whether the flicker intrinsic to IBM color mode will be displayed or disabled (at the possible price of sacrificing compatibility with some color software).

Limiting the Field

The main restriction in using the BoB is the monitor required. A high-scan-rate monitor with a scan rate of 24.83 KHz \pm 500 Hz must be used; the Princeton Graphics SR-12, with its 31-KHz scan rate, is not acceptable. Persyst recommends either the NEC JC-1410 or the Taxan 440. You can use a composite monitor, but much of the board's advantage would be lost.

Various options are available for the BoB, including a downloadable RAM character set, a ROM-based secondary character set, and an extended-graphics memory module, which allows 320×400 and 640×400 resolution. The sample board had only the secondary ROM character set, and so all tests were conducted in normal 200-pixel line modes.

When a system with the BoB/Taxan combination is started, it is immediately obvious that something unusual is afoot. The resolution of DOS's sign-on is excellent—definitely in the same league as a normal monochrome monitor. Persyst uses an 8- by 11-dot character in a 10×16 grid, which actually is denser than the character matrix used in IBM monochrome. The elegant, highly readable font is Persyst's own creation.

Even a very good color monitor like the Taxan is not as critically sharp as a monochrome monitor, and the specter of convergence always lurks in the background, but the display on the test system was just great. Some flicker appears during scrolling, as Persyst says, but it is less than a normal IBM color card, and it can be eliminated through the jumper setting. Overall, there's no question that the system could be used for continuous text processing. A few other boards reviewed in this series offer this kind of text performance on a

color screen, but the BoB's display is the equal of them at lower cost. Obviously, there's no comparison with a standard IBM-type color adapter.

Passing with Flying Colors

All the color programs I threw at the BoB worked normally, including Lotus's 1-2-3 and COLORBAR.BAS. There's a slight but perceptible flicker when large areas of the screen display light colors. I didn't notice this effect when using the Princeton Graphics SR-12 with review boards that can drive that monitor. It is possible the somewhat lower scan rate of the Taxan causes this, but, in any event, it

The performance of the BoB board was excellent. The only reservation I have is the need for a Taxan or an NEC monitor.

is rarely noticeable and not a major problem even then.

I could not test the 400-line modes without the optional memory upgrade, nor could I try the downloadable RAM character option. The RAM option is supplied with a utility that allows the user to design customized character fonts for the BoB and the Epson FX series of printers. It sounds like fun.

The performance of the BoB board was excellent. My only reservation is the need for a Taxan or NEC monitor. While the sample Taxan was fine and NEC makes very good monitors as well, it would be nice to have a wider choice. In general, the BoB card is a very nice product. It doesn't need special software to run normal color graphics programs, and it provides terrific text quality on one monitor—just as Persyst claims.—G.A.H.

PROFIT SYSTEMS MULTIGRAPH

The Profit Systems Multigraph is a video card designed to offer standard IBM-compatible monochrome and color and high-resolution monochrome graphics. It's a full-length, single board of good construction.

Installing the Multigraph requires only that the user decide how to configure the board. If a monochrome monitor will be used, one setting configures the board for either standard monochrome or high-resolution monochrome graphics mode akin to Hercules graphics, while another choice sets the board to a mode that displays color-mode graphics on the mono monitor. A different setting is used if the board will drive a color monitor. One eight-position switch is used to make the settings.

The Multigraph has only one video connector, which is used for whichever monitor the user has; you cannot connect two monitors simultaneously. Profit Systems takes great pains to point out that a monochrome monitor can be trashed if the switch settings are incorrect. This is a problem with many dual-purpose adapters with only one video connector, but it certainly would not give a beginner overwhelming confidence. The card will work with another display board in the system, which can be either a color or mono card; the Multigraph assumes the role not filled by the other video adapter.

High-Res Anxiety

Switching between normal IBM 80×25 mode and what Profit Systems calls Monochrome Graphics One mode (90 characters by 40 lines) is done with the MGMODE command. (This works only if the MGMONO command has been issued; MGMONO does not have any other effect, and so it would normally be put in

The end of

SOFTWARE

Aptec (for color Prism Printers)	
Rainbow Writer Color Text Formatter	\$119
Rainbow Writer Screen Grabber	69.
Ashton-Tate	
dBase II	255
dBase III	355
Framework	355
Friday!	169
Reference Encyclopedia (book)	55
Best Programs	
Personal Finance Programs	65
PC/Professional Finance Program II	149
PC/Fixed Asset System	297
PC/Tax Cut	129
Bible Research	
THE WORD (KJV Bible - 7 disks)	145
Borland International	
Sidekick	see special
Sidekick (unprotected)	see special
Turbo Pascal	see special
Broderbund	
Bank Street Writer	49
Bruce & James	
WordVision	39
Continental	
Home Accountant Plus	89
FCM (filing, cataloging, & mailing)	79
UltraFile (file, report, graph)	109
The Tax Advantage	39
Digital Research	
CP/M-86	39
Financier	
Financier II	115
Financier Tax Series	97
FriendlySoft	
FriendlyWriter (with FriendlySpeller)	55
Funk Software	
Sideways	45
Harvard Software	
Harvard Project Manager	219
Hayes	
Smartcom II	99
Please	225
Koala	
Speed Key	59
Lifetree	
Volkswriter Deluxe (with TextMerge)	159
Living Videotext	
ThinkTank	109
Lotus Development	
1-2-3	call
Symphony	call
Micro Education (MECA)	
Managing Your Money	119
Micropro	
WordStar	179
WordStar Propak	259
WordStar Propak Plus	349
WordStar 2000	259

PC Connection Software Special

through February 28, 1985

BORLAND INTERNATIONAL

Sidekick

A calculator, notepad, calendar, auto dialer, phone directory, and ASCII table— can be used with almost any software.

Copy protected..... \$30.

Non-copy protected..... 48

Turbo Pascal

Simple and elegant. A compiler for anyone without a degree in computer science..... 30

WordStar 2000 Plus	\$299
Microrim	
R:base 4000	259
Extended Report Writer	85
Clout	119
Microsoft	
Multipan (version 1.2)	125
Financial Statement (for Multipan)	69
Budget Analysis (for Multipan)	99
Cash Plan (for Multipan)	99
Microsoft Spell	35
Microsoft Word (version 1.15)	239
Microsoft Word with mouse (ver 1.15)	289
Microsoft Mouse with software	135
Microsoft Serial Mouse with software	135
Microsoft Project	155
Microsoft Chart	155
Microstuf	
Crosstalk XVI	99
Infoscope	149
Transporter (includes Crosstalk)	169
PCsoftware	
PCcrayon II	39
Executive Picture Show	139
CREATABASE	47
Peter Norton	
Norton Utilities	49
Rosesoft	
Prokey 3.0	89
Satellite Software	
WordPerfect	249
Software Arts	
TK!Solver	249
Software Publishing	
PFS:Access	59
PFS:File	85
PFS:Graph	85
PFS:Plan	85
PFS:Proof	59
PFS:Report	77

PFS:Write	\$85.
Softword Systems	
MultiMate	259.
Sorcim	
Supercalc 3	199.
Virtual Combinatics	
Micro Cookbook	29.
Soups & Salads (add-on disk)	15.
Warner Software	
The Desk Organizer	139.

TRAINING

ATI

SKILL BUILDER PROGRAMS

Intro To:

Word Processing Accounting

Business Software Data Bases

each 32.

How to Use:

Compaq MS-DOS (2.0)

CP/M-86 PC-DOS (2.1)

PC-Basic Home Accountant

IBM-PC VW Deluxe

each 32

TRAINING POWER PROGRAMS

How to Use

dBase II dBase III Lotus 1-2-3

MS Word Easywriter II Multimate

Multipan Supercalc 3 Framework

Symphony Wordstar TK!Solver

Peachtree (specify A/R, A/P, G/L, sales invoice, inventory) each 49.

Comprehensive Software

Intro to Personal Computing..... 39

Intro to Databases..... 39

Intro to Communications..... 39

Intro to the Operating System (PC Tutor) 39

Individual Software

The Instructor..... 35

Professor DOS..... 47

Tutorial Set (both items above)..... 75

Professor Pixel..... 47

Typing Instructor..... 39.

LEARN - PC Video

Introductory to Lotus 1-2-3 (videocassette training) specify VHS or BETA..... call

Scarborough Systems

Master Type..... 35.

EDUCATIONAL

Davidson

Speed Reader II (high school & college) 49

Math Blaster (grades 1-6)..... 35.

Word Attack (grades 4-12)..... 35

Additional Data Disks for other ages are available for Speed Reader II and Word Attack at \$15. each

Digital Research

Diagnostic Test (PSAT)..... 14.

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS.
© COPYRIGHT MICRO CONNECTION, INC. 1984. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE. IBM IS A REGISTERED TRADEMARK OF IBM CORP. PC CONNECTION AND MICRO CONNECTION ARE TRADEMARKS OF MICRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK.

PC CONNECTION®



PC Pub.

Affairs of the hearth.

(Or, many are cold but few are frozen.)

Some people call Marlow, NH (pop. 544) the "icebox of New England." We call it home. And neither rain, snow, sleet, hail, freezing rain, freezing brains, or the occasional seismic rumble can keep our trained PC consultants from making it to work at our glitzy new headquarters.

There's nothing like central heating to bring in a crowd. And after work there's nothing like a strong fire, a pint of bitter, and a couple of games of J-Bird or Frogger to empty the old internal database.

They're just a bunch of animals.

Don't jump to any conclusions about the locals pictured above. We're PC experts up here, stuffed to the last brain cell with the latest information on PC products. Monitors, disk drives, add-on boards, keyboards, business software, games, and a whole lot more.

Not to mention mice — what we know about mice could overflow your first 64K.

So if you're ready to add a new twist to your IBM-PC (XT or AT) give us a call. We'll dazzle you with our prices, delight you with our service, amaze you with our shipping, and bemuse you with our dry New England wit.

We'll even leave you thirsty for more.

Where'd you get a mug like that?

Next time you find yourself wrapped around your PC on a cold winter night, pull out your PC

Connection mug and fill it up with something legal. You'll find our mascot's face a welcome reminder that you are not walking the micro-computing road alone. The mugs are free to anyone who places a \$500.00 order between now and March 31.

Just call 1-800/243-8088 or 1-603/446-3383 anytime Monday through Friday 9:00 to 9:00, and Saturday to 5:30. If you're planning to visit us, bring snowshoes and call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.



The PC Connection mug. Ideal for coffee, tea, hot buttered rum, beer, etc. Limit one per customer. Not available to commercial accounts.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION

ilities is here.

CABLES

Extension Cables for IBM Mono Display \$39.
Keyboard Extension Cable (3 to 9 feet) 29.
AC Plug Adapter (any monitor to your PC) 8.

SURGE SUPPRESSORS

Diamond (similar to EPD Lemon) 39.
Emerald (similar to EPD Lime) 49.
Sapphire (similar to EPD Peach) 59.
Ruby (similar to EPD Orange) 69.

Epson

RX-80 with GRAFTRAX-Plus call
RX-80 F/T with GRAFTRAX-Plus call
FX-80 with GRAFTRAX-Plus call
RX-100 with GRAFTRAX-Plus call
FX-100 with GRAFTRAX-Plus call
LQ-1500 (letter quality dot matrix) call
Printer to IBM Cable (specify printer) ... 32.

FTG Data

Light Pen (Push Tip) 195.
Demo Disk Set for Light Pen 39.

Hayes

Smartmodem 300 199
Smartmodem 1200 459
Smartmodem 1200B (w/Smartcom II) 397
Smartcom II 99.
Compucable's Smartmodem-to-IBM
Cable 25.

Hercules Computer

Hercules Graphics Card (parallel port) 319.
Hercules Color Card (parallel port) 169.
Graph-X Software 42.

IOMEGA

Bernoulli Box see special
10 Meg cartridge see special
key tronic

Deluxe keyboard (KB 5151) call

Koala

Koala Touch Tablet with software
(connects to game port) 89.
Speed Key System 119.

Kraft

Joystick 35

Maynard Electronics

Floppy Drive Controller 135.
Internal Hard Disk (10 Meg) with WS-1
Controller 879.
Internal Hard Disk (10 Meg) with WS-2
Controller 1079.

Mouse Systems

PC Mouse (w/software & desk pad) ... 129
Mouse Paint (software) 75

NEC

Pinwriter P2(IBM) 80 column 679
Pinwriter P3(IBM) 132 column 897
Spinwriter 2050 (3550's little brother) 699
Spinwriter 3550 (IBM-PC compatible) 1397
Spinwriter 8550 (IBM-PC compatible) 1789

Orchid Technologies

All Orchid Boards come with PCnet Drive
(Ram disk), PCnet spool (print spooling),
disk caching & partitioning

Blossom 64k upgradeable to 384k,
with clock calendar, serial and
parallel ports \$229.

PCnet Daughter Board (piggybacks to
Blossom) with version 2.4 networking
software call

PCnet Blossom 64k Blossom Board with
the Daughter Board installed call
Diskless Boot Rom, Cluster Kit, etc. call

Plantronics/Frederick

COLORPLUS (with Color Magic) call

Princeton Graphics

HX-12 RGB monitor (690 x 240) call
SR-12 RGB monitor (690 x 480) call
Scan Doubler Board (for SR-12) call
MAX-12 Amber monochrome monitor .. call

Quadram

New Expanded Quadboard 64k
expandable to 384k, with clock calendar,
parallel, serial & game port, I/O bracket,
and Quadmaster software 249.

Microfazer Printer Buffer (parallel) w/copy

MP 64 (64k) upgradeable to 512k 169.

Quadcolor I 197.

Quadchrome RGB Monitor 469.

Quadchrome II 469.

SMA (Systems Management)

PC-Documate Keyboard Templates
available for:

DOS/Basic 1.1	Supercalc 3
DOS/Basic 2.0-2.1	Wordstar
Lotus 1-2-3	Turbo Pascal
Symphony	WordPerfect
Multiplan (IBM)	dBase II
Multiplan (Microsoft)	dBase III
Peachtext 5000	Framework
Easywriter II	Multimate
Volkswriter Deluxe	each 12.

STB

Graphix Plus II 339.

TG

Joystick \$39

WICO

Joystick 35

DRIVES

All drives are completely pre-tested. Specify
Drive A or Drive B for your PC. Comes with
complete step by step installation instructions.
Drives are 320k/360k.

Tandon

TM 100-2 (5 1/4") full-height drive (DS,DD) 159.

TEAC

FD-55B (5 1/4") half-height drive (DS,DD) 139

Free 'y' cable & bracket with each pair.

MEMORY

64k Memory Upgrade Set for IBM-PC
or XT system board 39.

64k Memory Upgrade Set for any memory
board specify make of board 39

Install memory upgrades & run diagnostics
at time of board purchase only 10

DISKS

Verbatim (with 5 year guarantee)

Datalife Disks SS/DD plastic box of 10 23.

Datalife Disks DS/DD plastic box of 10 33.

Disk Drive Analyzer 22.

Flip Sort (holds 75 disks) 19.

INFORMATION SERVICES

Compuserve

Compuserve Information Service
(includes subscription, manual, 5 hours of
connect time, monthly publications) 25.

Source Telecomputing

The Source (subscription & manual) ... 39.

We're junior compatible!

If you own an IBM-PCjr, you should be
talking with our resident junior experts
at Jr. CONNECTION. 1-800/IBM-
jrPC or 603/446-7761 Monday thru
Friday 9:00 to 5:30. They have the lat-
est information concerning both hard-
ware and software compatibility.

Need a new keyboard, monitor, mem-
ory upgrade? Not sure whether that new
game will run on junior? The staff at Jr.

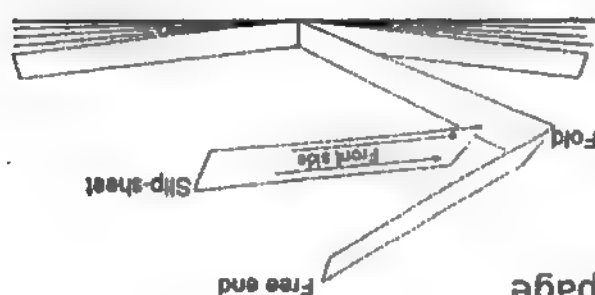
CONNECTION will make sure you
get the product that's right for you and
your system.

By the way, we don't sell computers.
Make the best deal you can on a basic
IBM-PCjr and come to us for the works.
You'll save a lot of money and be able to
pick from the best add-ons and software
programs on the market.

1-800/IBM-jrPC

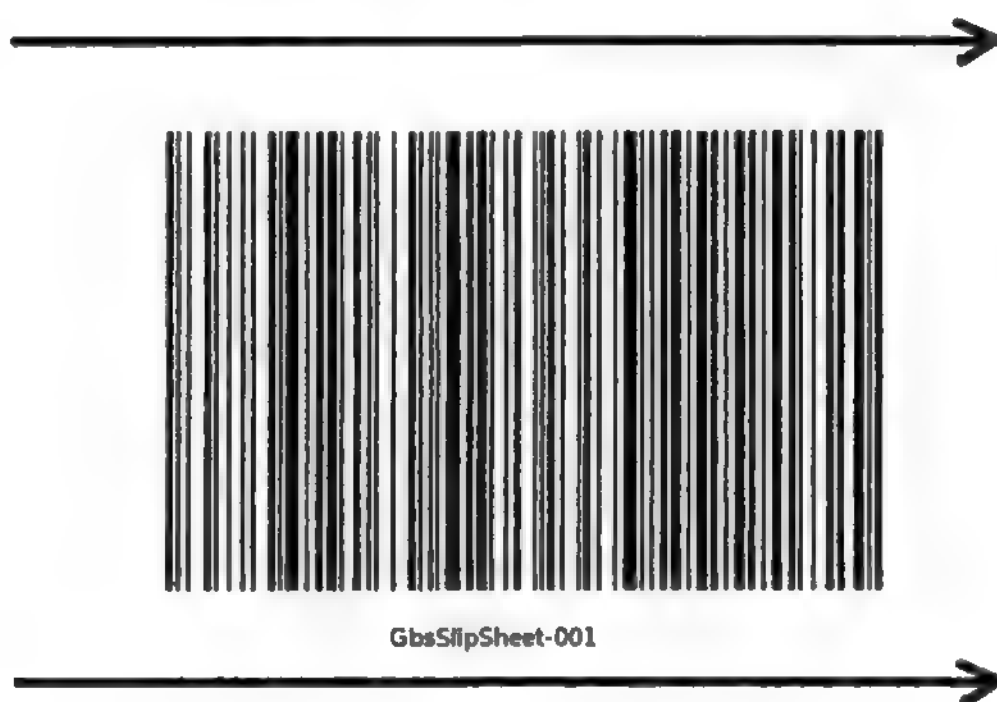
CIRCLE 339 ON READER SERVICE CARD

IBM PC CONNECTION®



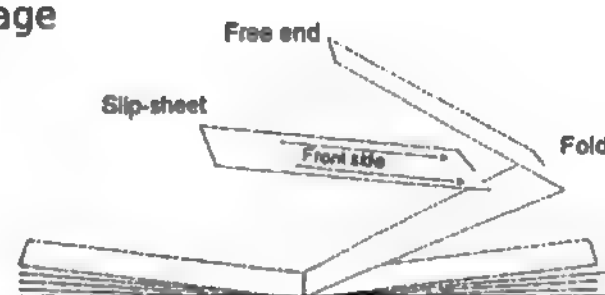
1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
 3. Slice the folded edge
 4. Close the page and slip-sheet

Inverted Foldout slip-sheet



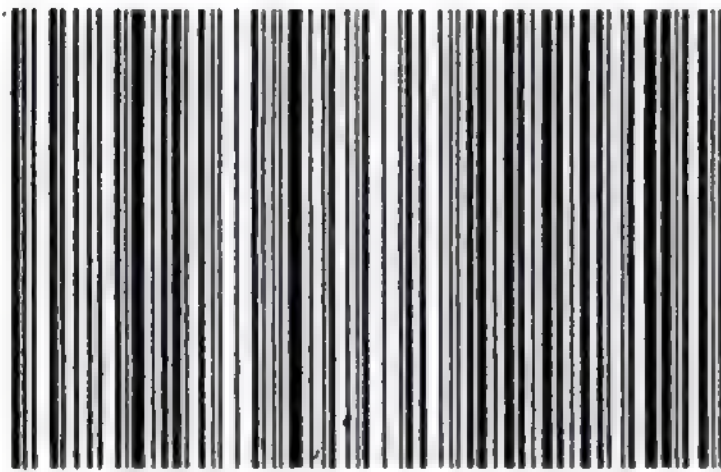
Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
 3. Slice the folded edge
 4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlipBack-0018

Back

1. Follow instructions on the other side

your PC perplex

OwlCat SAT (15 hour)	\$63.
OwlCat SAT (60 hour)	169.
FriendlySoft	
FriendlyWare/PC Introductory Set	35.
Spinnaker	
Educational Games for Young Computer Users. (All require graphics board).	
Delta Drawing (ages 4 to adult)	34.
Snooper Troops I (ages 10 to adult)	30.
Snooper Troops II (ages 10 to adult)	30.
Most Amazing Thing (ages 10 & up)	27.
Face Maker (ages 3 to 8)	23.
Kids on Keys (ages 3 to 9)	23.
Story Machine (ages 5 to 9)	23.
Fraction Fever (ages 7 to adult)	23.
Kinder Comp (ages 3 to 8)	20.
Rhymes and Riddles (ages 5 to 9)	20.
Hey Diddle Diddle (ages 3 to 10)	20.
Alphabet Zoo (ages 3 to 8)	20.
Stone (requires graphics board)	
My Letters, Numbers, Words (ages 1 to 5)	29.
Kids Stuff (ages 3 to 8)	29.
Across the U.S.A. (ages 5 and up)	22.

GAMES

Blue Chip	
Millionaire	39.
Tycoon	39.
Baron	39.
Broderbund	
Lode Runner	25.
CBS Software	
Match Wits	21.
Murder by the Dozen	23.
FriendlySoft	
FriendlyWare/PC Arcade	35.
Funtastic	
Snack Attack II (a favorite)	27.
Cosmic Crusader (as good as above)	27.
Big Top (climb to new levels)	29.
Master Miner (1 or 2 players)	29.
Hayden Software	
Sargon III	35.
Infocom Difficulty levels shown in italics.	
Seastalker (junior)	25.
Zork I (standard)	25.
Enchanter (standard)	25.
the Witness (standard)	25.
Planetfall (standard)	25.
Cutthroat (standard)	25.
Zork II (advanced)	29.
Zork III (advanced)	29.
Infidel (advanced)	29.
Sorcerer (advanced)	29.
Deadline (expert)	33.
Starcross (expert)	33.
Suspended (expert)	33.
Invisiclus (hint booklets) are available for all Infocom games. Specify game	7.
Microsoft	
Flight Simulator	35.
Origin Systems	
Ultima III	39.

PC Connection Hardware Special

through February 28, 1985

IOmega

Bernoulli Box (20 MEG)

- Fast and easy backup (3 minutes to backup a full 10 megabytes on 20 megabyte system)
- Interchangeable cartridges for ease of database and program distribution, archiving, and security
- Most rugged cartridge on market; can be mailed, carried, filed—even severe shock to subsystem won't cause data loss. \$2669.

Accessories

10 MEG cartridges	49
Bernoulli head cleaner	69

OUR POLICY

- We accept VISA and MASTERCARD
 - No surcharge added for charge cards.
 - Your card is not charged until we ship
 - If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
 - No sales tax.
 - All shipments insured; no additional charge.
 - Allow 1 week for personal and company checks to clear.
 - COD max. \$1000. Cash or certified check.
 - 120 day guarantee on all products.*
 - To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30
- You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

SHIPPING

Continental US: For monitors, printers, and drives, add 2% to all orders. For all other items, add \$2 per order for UPS surface, \$3 per order for UPS 2nd-Day-Air. We particularly recommend 2nd-Day-Air if you live west of the Mississippi or south of Virginia. In most cases it will only cost \$1 more and will save you up to four days on delivery time. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$3 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information.

1-800/243-8088

PC Connection 360M
6 Mill St., Marlow, NH 03456
603/446-3383

Orion

J-Bird (you'll never sleep)	\$29.
PC-Man	25.

PCSoftware

Armchair Quarterback	27
Chess 2001	27
Championship Blackjack	23

Professional Software

Trivia Fever	23.
--------------------	-----

Sir-Tech

Wizardry	42.
----------------	-----

Sierra/On-Line

Frogger	27.
Crossfire (keyboard or joystick)	23.
Ulysses and the Golden Fleece	27.

Spectrum Holobyte

GATO	27.
------------	-----

Strategic Simulations

The Warp Factor	27.
Tigers in the Snow	27

Sublogic

Night Mission Pinball	29
-----------------------------	----

HARDWARE

AST Research (For IBM-PC or XT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty.	
SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports (game port optional)	259
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional)	259
MegaPak 128k (not upgradeable)	call
MegaPak 256k	call
I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional)	129.
Parallel, Game, or second Serial Port for any AST board (specify board)	35.
Connectall connector bracket (PC only)	19
AST-5251	559.
AST-3780	629
MonographPlus with clock calendar, serial & parallel ports	429

Amdak

Video 300G monitor (green)	139
Video 300A monitor (amber)	149
Video 310A monitor (amber)	179

Compucable

Plastic Keyboard & Drive Cover Set	17
IBM Mono Screen Enhancement	17
Printer to IBM Cable (specify printer)	27.
Smartmodem to IBM Cable	25.

Cuesta Systems

Datasaver (200w power back up)	call
--------------------------------------	------

Curtis

STANDS

PC Pedestal (for IBM Mono or Color)	39.
PGS or Quadchrome Adapter for above	9.
Low Profile Tilt and Swivel Pedestal	39.
AD-2 Adapter for Portables	15
System Stand	21

For the IBM-PC Exclusively.

PC CONNECTION®

VIDEO BOARDS

the system's AUTOEXEC.BAT file so that it will be loaded automatically at start-up.) In the MG1 Mode, DOS has been patched to allow the full 90 × 40 display. Since this is a graphics mode, the standard IBM monochrome character font is not used; a font halfway between mono- and color-font quality is displayed instead. Scrolling is much like the IBM color card's; there is a disconcerting "ripple" effect. It's also unsettling to see the cursor disappear. This mode doesn't work with BASICA; the screen fills with vertical lines and other strange things happen.

A significant part of the documentation is devoted to installing special Profit Systems drivers for Lotus's 1-2-3 with the various possible configurations. The reason for this is that the Multigraph high-resolution monochrome graphics are similar to Hercules graphics in concept only. While the resolution is identical, the Profit Systems board is not compatible with the Hercules. Thus special drivers specific to the software must be used to correct for the inconsistencies between the Multigraph and the Hercules. Software designed for the Hercules will not work with the Multigraph any other way (I verified this finding with several Hercules-compatible programs).

Unfortunately, I could not get 1-2-3 to work with the Profit Systems drivers. The system simply hung up after 1-2-3 loaded, displaying absolutely nothing on the screen.

Hercules Yardstick

This problem could have been unique to my version of 1-2-3 (although I have the standard current release), but I think it illustrates a basic weakness in the Profit Systems design concept. Why come *close* to Hercules compatibility, with the same resolution and performance, and yet be incompatible? Even if the 1-2-3 drivers supplied had worked, what about the other Hercules-compatible programs appearing in increasing numbers? In any event, I was not able to test the high-resolution monochrome performance of the Multigraph.

As a color card, the Multigraph worked well and drove my Princeton Graphics Systems RGB monitor with no problems. Profit Systems supplies a DOS patching program, which eliminates the annoying flicker of an IBM color card and also writes to the screen significantly faster than without the patch. An 80-column by 40-line mode is available as well.

A parallel port is available as an option. It was not supplied with my test sample, so I can't comment on its performance. A nice feature is that the address of the port is fully changeable to any legal designation. Other options advertised by Profit Systems include enhanced color (up to 600 by 400 pixels with 16 colors), 132-column by 40-line monochrome, 720- by 700-pixel monochrome, and smooth scrolling, but none of these was supplied for review.

My overall reaction to the Multigraph is negative. I don't buy the design concept, and the drivers for 1-2-3 simply didn't work. Other products reviewed in this series do more and work correctly while offering full compatibility with Hercules-style monochrome graphics.—G.A.H.

QUADRAM QUADCOLOR I

The Quadcolor I is a straightforward color display adapter akin to the IBM color adapter card. It is manufactured by Quadram, a highly regarded producer of multifunction IBM-compatible boards, monitors, and other peripheral devices.

The Quadcolor I performs all the functions of a normal IBM color card and has a few rather minor enhancements as well. For example, the board has 32K of display memory rather than the 16K standard on an IBM card. This could be useful for simple animation techniques, but since the second 16K memory bank is not accessible from IBM BASIC, most users will

never use the extra capacity.

Another nicety is the ability to display any two of the 16 IBM colors—rather than only black and white—in high-resolution, 600- by 200-pixel mode. Connectors for a light-pen and RF modulator are provided, and there are also provisions for the Quadcolor II enhancement board (reviewed in this series).

Portless

On the other hand, the Quadcolor I does not include some of the features reasonably common on third-party color adapter boards. There is no parallel printer port (the IBM color card doesn't have one either), and only the normal double-dot color text font can be displayed.

There are no jumpers or switches to set on the board before merely plugging it in. The Quadcolor I is a full-length, single board of good construction.

Quadram makes quite a point of mentioning that its design eliminates the glitches that can result because of contention between the 6845 CRT controller and the PC's 8088 CPU. Writing to the screen is somewhat faster than a regular IBM color card, as well. However, there is flicker when a text screen scrolls. It is not quite as bad as with some competing color adapters or the IBM original, but it is annoying nonetheless.

Writing Awards

The Quadram documentation deserves special mention. It is well written, illustrated, and produced while being complete and detailed, and yet not stuffy. The manual has a professional feeling, which reflects well on the product as a whole. This documentation should be a model for other video board manufacturers.

The Quadcolor I works quite well, other than the moderate flicker. It holds no surprises but no real advantages either. Choosing the two colors to be displayed in high-resolution mode is a minor advantage and works as advertised. The Quadcolor I is not particularly exciting, but it is competent.—G.A.H.

QUADRAM QUADCOLOR II

The Quadcolor II is an enhancement piggyback board for the Quadcolor I adapter (see Quadcolor I review in this series) that adds extended color capabilities. The primary advantages offered by the upgrade are the ability to put 136 different colors on the screen simultaneously in 320- by 200-pixel, medium-resolution mode and 16 different colors at once in high-resolution, 640 × 200 mode. An IBM-compatible game port is also included.

The Quadcolor II plugs into a Quadcolor I through two banks of connectors. This process is easy, as is installation into a PC. There are no mysterious jumpers or switches to set.

The board operates as a standard color adapter, and the system comes up in normal color with no surprises. To use the extended color modes, you must run an initialization program. Quadram includes a simple installation program that automatically adds the appropriate command to an existing AUTOEXEC.BAT file or creates the AUTOEXEC if needed.

BASIC Patchwork

The installation program can also create a patched version of normal BASICA, which extends BASIC to allow access to the special color features offered by the Quadcolor II. The modified BASIC includes two new screen modes for the 136-color, medium-resolution and 16-color, high-resolution modes. It also provides SCREEN TO and SCREEN ON/OFF commands, which allow switching between Quadcolor screen modes and toggling of the Quadcolor I and II modes on and off. Various other BASICA commands are also modified in the BASICQ version to allow the normal BASIC commands to use the Quadcolor II features.

My sample Quadcolor II worked exactly the same as a Quadcolor I in normal

operation. Writing to the screen was fast, but flicker showed up during scrolling, albeit less than that exhibited by IBM's own color adapter.

Unfortunately, Quadram's patch to BASICA simply didn't work. The installation/patching process went smoothly, but every time I tried to load the modified BASICQ, the drive light stayed on and nothing happened on the screen. The system also would not respond to a keyboard reboot, and so power had to be cycled off and on. I tried the installation process and executing BASICQ on three different PC systems with an equal lack of success.

Version Diversion

A call to Quadram's support department revealed that the BASICQ patching process works well with the BASIC sup-

Quadram is prominent enough that the Quadcolor II should appear on the menus of popular color graphics programs.

plied with DOS 2.0 but doesn't work with the DOS 2.1 BASIC. Evidently IBM changed the internal design of 2.1 BASIC to accommodate the PCjr, and the changes were enough to throw the Quadram patch off. Reinstalling BASICQ with DOS 2.0 BASIC worked on the first try.

The extra screen modes and command enhancements provided by BASICQ all worked nicely. The 136-color, medium-resolution mode was truly lovely. All 136 colors can be displayed simultaneously; no palette groupings or other artificial barriers stand in the way of full use of the available spectrum. The 16-color, high-resolution mode also worked fine.

The Quadcolor II is an attractive package. Quadram is prominent enough that the Quadcolor II should appear on the menus of popular color graphics programs; so the extended color modes should be available in commercial software as well as usable in programs written by the user. The 136-color, medium-resolution mode is especially appealing, and the board is reasonably priced.—G.A.H.

SIGMA COLOR-400 COLOR ADAPTER

A new generation of RGB color monitors has appeared in recent months. The new monitors use a horizontal scan rate much higher than that of a standard IBM-type color monitor (usually in the range of 25 to 32 kHz or so) and display interlaced video rather than the noninterlaced video standard in IBM-type RGB monitors. Noninterlaced video displays each line of the video image twice to reduce flicker, as is done in broadcast video. This works well, but sacrifices resolution. Interlaced video displays a separate and distinct line for every line available on the screen, effectively doubling resolution. Interlaced video is a more critical mode, and component design and manufacturing tolerances must be superior. High-scan-rate monitors, therefore, cost more than regular RGB monitors, but the cost increment is not terribly great at IBM-type resolution. (Monitors with much higher resolution, usually with screen phosphors with longer persistence to reduce flicker but with less brightness, cost quite a bit more.)

The new breed of monitors, typified by the Princeton Graphics Systems SR-12 and similar units from Electrohome, Hitachi, and others, require special video adapter boards to drive them. Their crystal

VIDEO BOARDS

oscillators must operate at higher frequencies (typically 24 MHz), their memory speed may have to be faster, and their board software or firmware may require modification as well.

The Color-400 from Sigma Designs is an IBM-compatible color video adapter that is designed to drive the PGS SR-12 and equivalent monitors. If specially prepared software is used, full 640- by 400-pixel resolution in noninterlaced mode can be used for detailed graphics.

Making the Mundane Magnificent

Since little such software exists yet, a board like the Color-400 would not be terribly significant were it not for its most interesting aspect: normal IBM color programs can be displayed on a 400-line, high-scan-rate monitor. The Color-400 automatically creates a double of each program-generated line and displays it on the adjacent line, essentially creating a 400-line version.

While this doesn't sound like it would produce a major change in the appearance of the screen, in reality it does. Character and graphics shapes have a much more "filled-in" quality. They look continuous rather than "dotty." The overall effect is pleasing and quite a bit easier to work with than a normal color card driving a standard RGB monitor.

The sample Color-400 provided for evaluation was a prerelease prototype and had quite a few hand-wired patches. There are no jumpers on the board to set before merely plugging it in. A short program placed in the AUTOEXEC.BAT startup file is required for the demo board, but when the final version is released, Sigma will fill an empty ROM socket with a chip that will make the Color-400 run like any other color adapter.

Other than the 400-line conversion capability, in many respects the Color-400 runs very much like any other standard IBM-compatible color adapter. On the prototype, the single-dot character font is used instead of the clumsier double-dot font, and the single-dot font looks even

better than usual with the continuous appearance of the 400-line display. Sigma tells me the ROM production model will use the same very high-resolution character font as the company's Graphics Dazzler boards. As I commented in the reviews of those boards, the text display approaches monochrome quality. Adding to the excellence of the display is the total absence of flicker during scrolling. So at long last, there's a color display I'd be willing to write on all day.

I tested the Color-400 with several programs configured for a normal IBM color display. Lotus's *1-2-3* worked perfectly, with its graphs displayed in vivid red, blue, and green rather than the normal, pallid palette. *WordStar*, in color, benefited from the better-looking characters, and other graphics programs looked just as good. Running *COLORBAR.BAS* revealed an oddity: all the color bars had the same intensity, and accordingly, the "gray" bar didn't display at all. Obviously, the intensity control was not working on the sample board. This is an artifact of the prototype that Sigma says will be corrected in the released version.

Broad Strokes

Sigma provided a sample of a new program called *PC Paintbrush* from IMSI to help evaluate the board. *PC Paintbrush* is, to put it politely, inspired by *MacPaint* on the Apple Macintosh. The major difference is color. While the program supports several different color boards, including Tecmar, Scion, Quadcolor, and Amdek, there currently is no special version for the Color-400. But the Sigma board did an excellent job with it configured for a normal IBM color display.

A special version of *PC Paintbrush* is being prepared that will use the full 400-line display capacity of the Color-400. Sigma plans to bundle the 400-line *PC Paintbrush* with a Mouse Systems optical mouse for only \$100 more. This package represents quite a bargain, given the price of the *PC Paintbrush* software and the mouse.

The Color-400 is not inexpensive, and the added cost of a high-scan-rate monitor must be considered in determining whether the improved performance is worth the price. There is no question that software that uses the full 400-line resolution capacity is terrific. Software using 200 lines also looks a lot better, and the Dazzler high-resolution text font is wonderful. The user also gets a color board that's standard in other respects (there are no parallel port, added colors at high resolution, compatibility with Plantronics, or other advanced color features), albeit a color board that performs well. As more 400-line software is released, the Color-400 will look better and better. In the meantime, each potential purchaser must decide based on how critical his or her color display needs are. The Color-400 definitely improves any color program, and for users to whom the added cost is not a major stumbling block, I recommend it highly.—G.A.H.

GRAPHIC DAZZLER I AND GRAPHIC ENHANCER

The Sigma Designs's Graphic Dazzler I is a specialized, high-resolution, color video card capable of performance beyond that of most boards reviewed in this series. Unlike some other supercolor cards, it can be used with standard IBM-type RGB color monitors, although its performance is even better with special monitors that have high scan rates, like the Princeton Graphics SR-12.

Sigma states flat out that the Dazzler I is not intended to replace a standard monochrome or color card as a general-purpose

Micro Flash is Here to Stay

- On June 24th, 1984, in the Business Section of the San Francisco Examiner & Chronicle, John Dvorak recommends Micro Flash as one of the "companies with a future."
- Since 1981 we have provided quality products for business and personal computer systems, combined with unsurpassed customer service and support.
- Call and discover why our low prices, fast service and well-stocked inventories have made Micro Flash the choice for today — and TOMORROW!

Micro Flash Guarantee

- We sell the latest versions
- We support what we sell
*We won't tell you to call the publisher or manufacturer for after-sale support.
We want you to call us!*
- We won't sell you anything we don't think you need
- If the product is defective when you receive it — we'll replace it!

Micro Flash Terms

- MasterCard or VISA — with no credit card surcharge added
- Mail Orders accompanied by a check
- Call our Credit Manager for information on institutional purchase orders
- All returns must have authorization
- \$100.00 minimum order
- Products and prices subject to change
- Corporate Discounts

Micro Flash Shipping

- \$6.00 for UPS surface (except for printers and monitors)
- Add \$3.00 per item for UPS 2nd Day Air
- All shipments fully insured at no extra charge
- Call for information on foreign orders, US Mail, CODs
- Overnight delivery service available

PRODUCTS FOR IBM PC & COMPATIBLES

HARDWARE & PERIPHERALS	RETAIL PRICE	MICRO FLASH
Alloy PC+ 20MB w/Tape B.U. . . .	\$4295.00	\$3600.00
AST Research		
SixPakPlus 64K	395.00	269.00
MegaPlus II 64K	395.00	269.00
ADVANTAGE! 128K for AT	495.00	379.00
64K Ram Chip Sets	100.00	50.00
Hauppauge Intel 8087 Chip	175.00	157.00
Hauppauge Intel 80287 Chip	295.00	275.00
Hayes Smartmodem 1200	699.00	489.00
Hayes Smartmodem 1200B	539.00	439.00
Hercules ColorCard	245.00	198.00
Hercules Graphics Card	499.00	369.00
IOMEGA Bernoulli Box 20MB	3695.00	2995.00
Plantronics PC+ COLORPLUS (SYMPHONY COMPATIBLE)	560.00	389.00
Printers — Epson, Okidata, Diablo NEC, JUKI & Others		\$CALLS
Princeton Graphics		
MAX-12 Amber Monitor	249.00	189.00
HX-12 HI-RES RGB	695.00	524.00
SR-12 SUPER HI-RES RGB Monitor w/Scan Doubler	1048.00	843.00
PTI Datasheet Back-up Power Supply — 200 Watt	359.00	325.00
Persyst BOB Display Card	595.00	476.00
Taxan 440 RGB w/Text Switch	899.95	759.00

SOFTWARE

Ashton-Tate dBaseIII	\$ 695.00	\$ 369.00
FRAMEWORK	695.00	389.00
BPI Systems Accounting ea.	595.00	398.00
FUNK Software SIDEWAYS	60.00	48.00
Harvard Project Manager	395.00	276.00
Human Edge Mind Prober	49.95	39.00
Lifeboat Lattice C Compiler	500.00	354.00
Living Videotext Think Tank	145.00	110.00
Microsoft*		
Multiplan™	195.00	139.00
Word & Spell	375.00	249.00
Word & Spell w/Mouse	475.00	298.00
Basic Compiler	395.00	276.00
C Compiler	500.00	349.00
Fortran Compiler	350.00	244.00
Cobol Compiler	700.00	518.00
Macro Assembler	100.00	74.00
Project	250.00	198.00
Chart	250.00	198.00
Morgan Computing Trace 86	125.00	99.00
Professional Basic	345.00	299.00
MultiMate Word Processor	495.00	279.00
Quarterdeck DESQ	495.00	376.00

PRODUCTS FOR APPLE MACINTOSH

Haba Systems Hadadex	\$ 200.00	\$ 159.00
Human Edge Mind Prober	49.95	38.00
Microsoft*		
Multiplan™	195.00	138.00
Basic Interpreter	150.00	122.00
Chart	125.00	99.00
Word	195.00	148.00
PFS File & Report Package	195.00	148.00
Stoneware DB Master	195.00	148.00
Telos Filevision	195.00	148.00
Tecmar 5 MB Removable	2295.00	1695.00

Many other
products available
at comparable
discounts!
Quantity
pricing available

For product
information,
price quotes,
technical support
and California
orders,
please call

415/680-1157

To order from
outside California,
call

800/458-2433

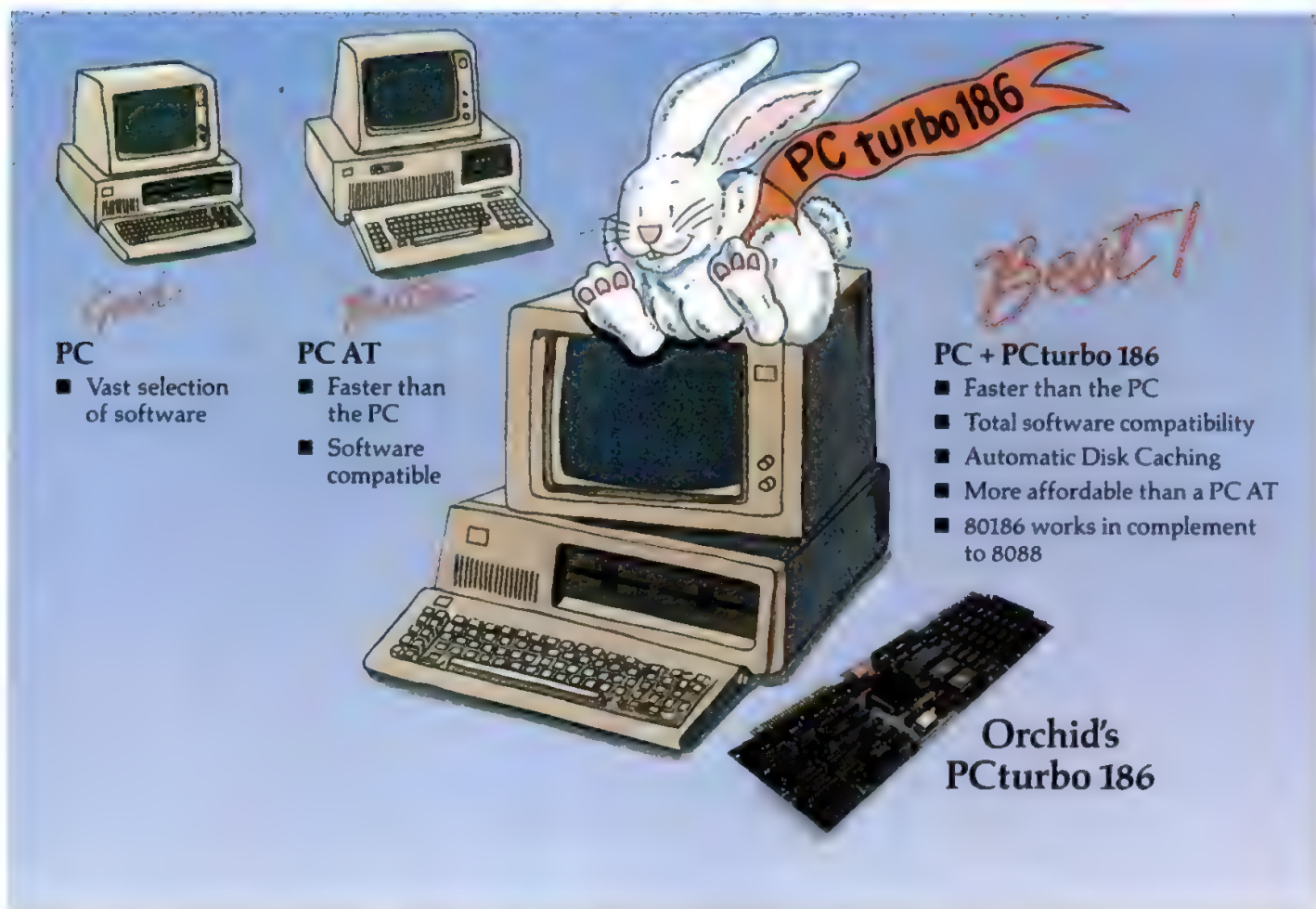
Member: Better Business Bureau, Chamber of Commerce
Listed: Dun & Bradstreet



COMPUTER SYSTEMS

1110 Burnett Avenue, Suites J & K
Concord, CA 94520

The PCturbo 186™ takes a good computer and makes it the BEST!



PC

- Vast selection of software

PC AT

- Faster than the PC
- Software compatible

PC + PCturbo 186

- Faster than the PC
- Total software compatibility
- Automatic Disk Caching
- More affordable than a PC AT
- 80186 works in complement to 8088

**Orchid's
PCturbo 186**

First the standard was the IBM™ PC. Then it became the IBM PC AT with its high processing speed. For those, however, who have an IBM PC and need PC AT-like performance, Orchid Technology will put you out in front again with a new standard—the PCturbo 186. The PCturbo outperforms the PC AT in speed with fast disk access, and unmatched performance while providing complete software compatibility.

Best of all, PCturbo allows you to protect your existing hardware and software investment without the cost of replacing your existing PC or the need to learn to use a new computer and its software. Simply install the PCturbo adapter board and Orchid's "Productivity Software" and your PC becomes a powerful turbo-driven computer.

The PCturbo 186 is actually a second computer within your PC. Powered by the advanced Intel 80186 processor, the PCturbo

is transparent to your favorite programs like Lotus 1-2-3™, Symphony™, dBase II or III™, Framework™ and Multimate™, running them at turbo speeds. So, with PCturbo, your PC looks and acts the same as before; it just runs faster.

While the PCturbo is speeding up your processing power the 8088 microprocessor in your PC takes care of the I/O functions. Most importantly, complete compatibility is assured since the PCturbo allows you to switch back and forth between Turbo Mode and PC Mode with a simple command.

Since PCturbo boosts the processing speed of your PC, there's no more waiting to recalculate spreadsheets or to retrieve data. With the unique built-in features like automatic disk caching, electronic RAM disks and print spooling, you can get even more done in less time. Now isn't that why you bought a PC in the first place?

TECHNICAL DETAILS:

Hardware

- Single slot plug-in board with high-speed 16-bit processor (80186).
- Up to 640K memory expansion for a maximum of 1.28 Megabytes total memory.
- Simple "one-step" installation.

Software

- Runs IBM PC-DOS 2.x/3.x on either the IBM PC/XT and versions of most compatibles.
- Provides high speed disk caching, RAM disk and print spooling.
- Standard PC (8088) operation for total compatibility.

Write or call for more information today.



ORCHID TECHNOLOGY
47790 Westinghouse Drive
Fremont, CA 94539
(415) 490-8586 Telex: 709289

PCturbo 186 is a trademark of Orchid Technology. IBM is a registered trademark of International Business Machines Corporation. Lotus 1-2-3 and Symphony are trademarks of Lotus Development Corporation. dBase II, dBase III, and Framework are trademarks of Ashton-Tate. Multimate is a trademark of Multimate International.

CIRCLE 412 ON READER SERVICE CARD

VIDEO BOARDS

display card. It is compatible with software that writes to the screen through the IBM BIOS routines, but since so many programs circumvent the BIOS and write directly to the video hardware for increased speed, the Graphic Dazzler I won't work with much available software.

What the board is, on the other hand, is a very advanced high-resolution graphics device with unprecedented video memory. The NEC 7220 graphic display controller is used to generate the video, rather than the prosaic Motorola 6845 used on most IBM-compatible video cards. It is a truism that dedicated hardware can be much faster than software performing the same functions, and the 7220 has hardware logic to perform such functions as panning, zooming, line and arc drawing, and area filling at extremely high speed.

Memory Mass

A "basic" Graphic Dazzler I has 256K of display memory, and the optional Graphics Enhancer plug-in adds another 256K for a total of 512K! All this memory is used to create a video memory of 1,024 by 1,024 by 2 bits on the base board and 1,024 by 1,024 by 4 bits on the expanded card. The display area can be panned over the entire 1,024 × 1,024 memory area. A 4-bit by 4-bit color map is used to display 16 colors without modification of the display memory. DMA (direct memory access) is provided by Sigma for high-speed memory transfers.

The Dazzler I operates in 640 × 200-pixel mode on normal IBM RGB monitors and equivalents like the Princeton Graphics HX-12. If a color monitor with a horizontal scan rate of at least 25K, like the PGS SR-12, is available, a 24-MHz crystal can be inserted into the Dazzler I and the system can then display 640 × 400 resolution.

The Graphic Dazzler I can serve as the sole color card in a system, with the compatibility limitations mentioned above, or happily coexist with other monochrome or color adapters. Sigma provides switching

software to move from monitor to monitor if necessary.

Installing the Graphic Dazzler I involves only plugging in the card. While there are jumpers on the board, no user adjustment is needed. The card is driven

The Graphic Dazzler I is a very advanced high-resolution graphics device with unprecedented video memory.

by software dependent on the version of DOS being used and whether there is another monitor and display card in the system. Software is provided for DOS 1.x and DOS 2.x, with the 2.x version using CONFIG.SYS to insert a driver into DOS. There is also a freestanding initialization program, which can be inserted into AUTOEXEC.BAT to bring the system up, and both methods are easy to install.

Shown on a PGS HX-12, the display was crisp and steady. The font is not the standard double-dot IBM style; a single-dot font similar to that available with a Plantronics board is used instead. The font is sharp, but a few of the characters, like the lowercase *m*, are a bit hard to read.

Sigma supplied two ways to check the board's performance. The demo program is an absolute knockout. While there are other products that can display 16 colors simultaneously, the real difference with the Dazzler I is speed. Writing, panning, and scrolling are lightning fast. Even smooth scrolling is possible, with a smoothness and ease not often matched even in monochrome.

Sigma also supplied a copy of Personal CAD Systems's *PCAD* computer-aided-design program for the review, since this program supports at least some of the Daz-

zler I's features. The program worked well but had some limitations, not using all the advanced video capabilities available from the enhanced Graphic Dazzler I. *AutoCad*, a fine, competing CAD program, evidently also supports the Dazzler I, but the appropriate driver was not available for testing.

Not for the Timid

The excellent documentation includes detailed instructions on how to create software for the Graphic Dazzler I. Sigma provides an object file that can be linked with user-created software to ease the development process. Suffice it to say that programming the Dazzler I is not a task for novices who think the graphics commands in IBM BASICA are complicated. Commercial software houses shouldn't have any major problem, though.

I also tried the Dazzler I with a high-scan-rate Princeton Graphics SR-12 after inserting the 24-MHz crystal into the Dazzler I. The board came up instantly with no problems. Absolutely no flicker or other on-screen glitches appeared. The special character font has much better resolution than normal color characters and approaches the clarity and readability of monochrome characters. The Sigma demo program ran even better on the SR-12, with vivid colors, excellent resolution, and extremely fast operation.

Unlike normal color text displays, which are unpleasant to look at right away and become tiresome and unacceptable after a period, the Dazzler I/SR-12 combination would be perfectly acceptable for continued heavy use. This is the first affordable color display I would characterize this way.

The Graphic Dazzler I is clearly designed for CAD and similar advanced applications. While it is obviously a specialized product, its cost is quite reasonable compared to alternatives using similar advanced hardware (the Vectrix system, for example). Using such high-powered hardware sort of ruins one for the run-of-the-mill PC color card. It's unrealistic to

Dumb.



*Stand-alone programs
can't be made to work as a system
no matter how hard you might try.*

Stand-alone programs are fine. Unless, of course, you need them to work together. Because the sum of the parts will never equal a whole.

That's why even the highly touted WordStar,*

dBase II* and 1-2-3,* programs don't make sense as a business system.

They were designed to perform very specific application functions only, and therefore, make miserable workmates.

Fortunately, there's a smart solution. It's the new Smart Software System.

Smart's unique "modular integration" is the key to productivity. It means that The Smart Word Processor, The Smart Data Manager

Smart.



*The fully integrated
Smart Software System is designed
to make the whole office more productive.*

and The Smart Spreadsheet with Graphics not only have the uncompromising power and capacity of these leading stand-alone programs, but they also have the unprecedented capability to work brilliantly together.

So you can easily transfer data and pass commands from one to another. Which means that you can compile financial data, to be included in graph-form, within the text of a printed report, that's mailed to a list drawn

from the data manager — automatically.

Don't short change your business by attempting to squeeze the impossible out of a makeshift software system. Get Smart, and the whole office will thank you.

Smart is available for the IBM PC, PC/XT, PC/AT, and compatibles. For information call, 800-GET-SMART. (In Kansas call, 913-383-1089).

Smart Software
from Innovative Software

*1-2-3™, WordStar™ and dBase® are registered trademarks of Lotus Development Corporation. Micro Pro International Corporation and Ashton-Tate respectively. © 1984 Innovative Software, Inc.

CIRCLE 272 ON READER SERVICE CARD

VIDEO BOARDS

hope that a wide spectrum of general software will appear for a board like this, but if I could wave the proverbial magic wand, that's what I'd want. The performance of the Graphic Dazzler I is simply in a class apart if software appropriate to your needs is available.—G.A.H.

GRAPHIC DAZZLER II

The Graphic Dazzler II is a slightly simplified version of the excellent Graphic Dazzler I reviewed in this series. In many ways, it meets an ideal definition of a "baby brother" product: it provides essentially all the functionality of its senior model with only minor sacrifices, takes up less room, has fewer chips for enhanced reliability, and, perhaps most importantly, costs significantly less.

Inexpensive Specialist

Like the Graphic Dazzler I, the Dazzler II is a specialized, high-performance color adapter card that is not designed to supplant a standard color or monochrome adapter (although it can serve as the only display card in a system dedicated to high-resolution color graphics). It is designed for CAD, animation, and other serious graphics applications and includes high-speed hardware graphics in the form of the powerful NEC 7220 graphic display controller and appropriate support hardware.

The only important attribute Dazzler II sacrifices is display memory: it has less than the Dazzler I. The Dazzler II has 640-by-400-by-4-bit memory, whereas the Dazzler I has a 1,024-by-1,024-by-2-bit memory (4-bit when equipped with the optional Graphics Enhancer). Since the Dazzler II display memory is sufficient to manage an entire IBM PC screen, little is lost other than high-speed panning through the extended memory on the more expen-

sive board.

The Dazzler II installs in the same manner as the Dazzler I. The only jumper that you may have to set is one indicating whether 200-line interlaced or 400-line noninterlaced mode will be used. Other than that, you just plug it in, set up either a CONFIG.SYS or AUTOEXEC.BAT file with the appropriate Sigma driver to match the version of DOS being used, and then, away you go.

The Same for Less

I tested the Graphic Dazzler II with a high-scan-rate Princeton Graphics Systems SR-12 in 400-line noninterlaced mode and all went as I expected. To my eyes, the Dazzler II duplicated exactly the incredible speed and resolution of the Dazzler I. Performance was, in a word, dazzling.

The Dazzler II costs \$995, while the basic Dazzler I is \$895 and the enhanced Dazzler I is \$1,590. Thus the Dazzler II offers essentially the same performance in terms of 16 colors on the screen, fast hardware panning, zooming, line and arc drawing, and so, for quite a significant saving. This excellent product is highly desirable if available software customized for the card meets your requirements.

—G.A.H.

STB GRAPHIX PLUS II

The Graphix Plus II from STB Inc. is a video adapter card that can drive both monochrome and color monitors. In addition to IBM compatibility with both types of monitors, the Graphix Plus II offers high-resolution monochrome graphics and enhanced color modes.

One eight-position switch must be set before installation. The documentation is

clear on the settings required for mono-only, color-only, and dual-monitor systems. The board has two nine-pin connectors, one for each type of monitor, and a composite monochrome RCA jack (the Graphix Plus II doesn't support composite color monitors).

Once the card is installed, operation is simple. No special commands are needed to switch between the color and the monochrome monitor. The regular DOS MODE command switches you back and forth very easily. The monitor not in use is automatically disabled, so there is no problem in leaving both monitors connected. Like many similar dual-purpose video adapters, the Graphix Plus II has only one CRT controller chip, and so it's impossible to display material generated by the STB on both monitors simultaneously. But you can use the card with another video card in the system for those situations in which you require simultaneous display.

By the Displayful

The Graphix Plus II has a monochrome graphics mode with 640-by-350-pixel resolution, using the full display area of an IBM-type monochrome monitor. This resolution is somewhat less than that of the Hercules, but the difference isn't terribly noticeable on screen. Obviously, STB mono graphics are not compatible with those of the Hercules, and so you can't use any of the Hercules-compatible software on the market. An 80-character-by-44-line monochrome text mode is also provided, and true gray scales can be generated on the mono screen.

Enhanced color is also available. The STB can display four colors at maximum 640-by-200 resolution, as compared with the standard black and white produced by a normal IBM color card of that resolution. And it can display 16 colors at medium resolution of 320 by 200.

Perfect Emulation

Operation in normal monochrome and color modes emulated the standard IBM functions perfectly. There was absolutely



Trade over the counter.

Introducing the most complete 24-hour investment service on the market.

Spear Securities has teamed up with The SourceSM to bring you the most comprehensive personal investment service ever introduced.

Now you can use any personal computer to trade stocks, options or bonds quickly and inexpensively. Without software. But that's not all.

Immediate access to market intelligence.

If you're going to compete with professional investors, you need more than instant trading. That's why we give you the ability to analyze and compare thousands of companies. And we provide immediate access to critical business news and price changes as they occur.

We even take care of your portfolio updating and record-keeping. And your account is protected up to \$10 million.*

Get started for \$35-a-trade.

Between now and February 28, 1985, most market orders placed with Spear Securities (up to 1,000 shares) will cost only \$35 each. After that, you'll enjoy our regular discount rates, which will save you up to 70% on stock transactions compared to full-cost broker commissions.

The coupon on the right will get you all the details. Fast. Our toll-free number is even faster. Just dial **(800) 821-1902**. In California, call **(800) 321-6116**.

*Combination of SIPC protection and private insurance. See brochure for details.

SIPC Member
Available exclusively via The Source **NASD**

SPEAR SECURITIES

The Electronic Investment Center

626 Wilshire Boulevard
Los Angeles, CA 90017

- ☐ Send me information on how to trade over the counter.
☐ I have a personal computer.
☐ I am currently a member of The Source.

Name

Address

City

State Zip

PC-9-19

Spear Securities, a member of the NASD and SIPC, is a wholly owned subsidiary of Investment Resources & Technology, Inc. The Source is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. The Source services are offered in participation with Control Data Corporation.

CIRCLE 407 ON READER SERVICE CARD

NORTHEASTERN SOFTWARE

88 Ryders Lane, Stratford, Connecticut 06497

- Up to 50% off/software purchases over \$300 an additional 2% off
- New larger facilities to serve you better
- School & corporate purchase orders accepted
- No additional charges for credit card orders

Entertainment

ARMONK	
Executive Suite	27.00
ATARI	
Defender	28.00
Centipede	28.00
Dig Dug	28.00
Donkey Kong	28.00
Joust	28.00
Jungle Hunt	28.00
Moon Patrol	28.00
Ms. Pac Man	28.00
Pac Man	28.00
Pole Position	28.00
Robotron	28.00
StarGate	28.00
EPYX/AUTOMATED SIMULATIONS	
Crush Crumble & Chomp	21.00
Temple of Apshai	28.00
Star Warrior	21.00
BLUECHIP	
Baron	38.00
Millionaire	38.00
Tycoon	38.00
BRODERBUND SOFTWARE	
Lode Runner	23.00
Serpentine	23.00
FUNSTASTIC	
Big Top	28.00
Cosmic Crusaders	28.00
Master Miner	28.00
HAYDEN	
Sargon III	34.00
INFOCOM	
Deadline	29.97
Enchanter	29.97
Infidel	29.97
Planetfall	29.97
Sorcerer	29.97
Starcross	27.00
Suspended	29.97
Witness	29.97
Zork I	27.00
Zork II	27.00
Zork III	27.00
Seastalker	27.00
MICRO LAB	
Miner 2049er	25.00
Death in the Caribbean	25.00
The Heist	25.00
MICROSOFT	
Flight Simulator	32.00
OBESTA	
Chess	45.00
Backgammon	35.00
ORIGIN SYSTEMS	
Caverns of Callisto	24.50
Ultima III	35.00
ORION SOFTWARE	
J-Bird	25.00
PC-Man	24.50
Paratrooper	21.00
Pits & Stones	28.00
PC SOFTWARE	
Armchair Quarterback	24.00
Championship Blackjack	24.00
Chess 2001	24.00
SEGA CONSUMER PRODUCTS	
Buck Rogers	29.50
Congo Bongo	29.50
Star Trek	29.50
Zaxxon	29.50
SIERRA	
Frogger	24.00
Ultima II	30.00
Championship Boxing	24.00
SIRIUS SOFTWARE	
Buzzard Bait	24.50
Call To Arms	21.00
Gorgon II	27.00
KID TECH SOFTWARE	
Wizardry I	39.00
STRATEGIC SIMULATIONS	
Battle for Normandy	29.00
The War Factor	29.00
Tigers In The Snow	29.00
SUBLOGIC	
Night Mission Pinball	26.00

Educational

ATI	
All training programs	48.00
BARRON'S EDUCATIONAL SERIES	
Computer SAT	55.00
ONE SOFTWARE	
College Board	115.00
Goren's Bridge	53.00
Mastering The SAT	98.00
Murder By The Dozen	24.00
Match Wits	20.00
CODEX	
All training programs	44.00
COUNTERPOINT SOFTWARE	
Early Games for Young Children	20.00
Early Games Fraction Factory	20.00
Early Games Match Maker	20.00
Early Games Piece of Cake	20.00
Quizagon	28.00
DAVIDSON & DAVENPORT	
Mathblaster	33.00
Speed Reader II	45.00
Word Attack	33.00
DESIGNWARE	
Creature Creator	27.00
Crypto Cube	27.00
Math Maze	27.00
Spellicopter	27.00
Spellakazan	27.00
Spellagraph	27.00
DLM	
Alien Addition	24.00
Meteor Multiplication	24.00
Minus Mission	24.00
Demolition Division	24.00
Alligator Mix	24.00
Dragon Mix	24.00
EDUWARE	
Algebra I	28.00
MARCOURT BRACE JOVANOVICH	
Computer SAT	56.00
Gre Test	63.00
HUMAN EDGE	
Management Edge	105.00
Sales Edge	105.00
Negotiation Edge	105.00
INET CORD	
Speed Read Plus	62.00
KNOWARE	
Knoware	64.00
LEARNING CO.	
Magic Spells	24.00
Moptown Hotel	28.00
Moptown Parade	28.00
Work Spinner	24.00
Addition Magician	24.00
MECA	
Basic Building Blocks	58.00
SCARBOROUGH	
Master Type	30.00
Run For The Money	33.00
SCHOLASTIC	
Turtle Tracks	28.00
SIERRA ON-LINE	
Dragon's Keep	21.00
Troll's Tale	21.00
SIMON & SCHUSTER	
Typing Tutor III	30.00
Wordvision	58.00
SPINNAKER SOFTWARE	
Alphabet Zoo	19.00
Delta Drawing	33.00
Face Maker	22.00
Fraction Fever	22.00
Hey Diddle Diddle	19.00
In Search of the Most	
Amazing Thing	25.00
Kindercomp	19.00
Rhymes & Riddles	19.00
Story Machine	19.00
Kids on Keys	19.00
Snooper Troops #1	24.97
Snooper Troops #2	24.97
UNICORN SOFTWARE CO.	
Ships Ahoy	28.00
Ten Little Robots	28.00
VISICOMP	
Visi Tutor	Call

Printers

BRUNNEN	
HR-25	645.00
CITON	
Prowriter 8510AP	319.00
Prowriter 8510 SP	465.00
DYNAX	
DX-15	435.00
EPSON	
FX 80	Call
FX 100	Call
RX 80 FT	Call
LQ 1500	Call
IDS	
Prism 80 (Basic)	1,055.00
Prism 80 (Full)	1,385.00
Prism 132 (Basic)	1,225.00
Prism 132 (Full)	1,865.00
Microprism	425.00
JUKI	
6100	445.00
MANASMAN TALLY	
MT 160L	500.00
MT 180L	795.00
MT Spirit	295.00
NEC	
NEC 2050	1,440.00
OKIDATA	
92 P	425.00
93 P	655.00
SILVER REED	
Exp 400	Call
Exp 500	Call
Exp 550	490.00
Exp 770	875.00
STAR MICRONICS	
Gemini 10X	Call
Gemini 15X	389.00
Power Type	355.00
Radix-10	620.00
Radix-15	720.00
TRANSTAR	
315	455.00

Monitors

ANDEK	
310A	175.00
300A	147.00
300G	125.00
Color II Plus	425.00
PGS	
HX-12	467.00
Max 12	189.00
QUADRAM	
Quadchrome	Call
TAXAN	
RGB III	445.00
RGB 420	535.00
USI	
12" Green	125.00
12" Amber	142.00

Modems

ANCHOR AUTOMATION	
Mark XII 1200	280.00
Mark VI	189.00
HAYES	
Smartmodem 300	199.00
Smartmodem 1200	475.00
Internal 1200B	390.00
NOVATION	
Access 1-2-3	440.00
Smart Cat 103-212	415.00
J-Cal	99.00
PROMETHEUS	
Pro Com 1200	389.00

Blank Media

Elephant SS/DD	17.00
Verbatim SS/DD	19.00
Verbatim DS/DD	24.00
Maxell SS/DD	19.00
Maxell DS/DD	23.00
Memorex SS/DD	21.00
Wabash SS/DD	19.00

Specials

ALPHA	
Electric Desk PC	207.00
Electric Desk JR	177.00
BORLAND	
Turbo Pascal	34.00
Side Kick	34.00
BRODERBUND	
Bank Street Writer	47.00
CENTRAL POINT	
Copy PC	23.00
HANVARD	
Project Manager	240.00
PETER NORTON	
Norton Utilities	48.00
ROSESOFT	
Prokey 3.0	79.00
SATELLITE SOFTWARE	
Word Perfect	247.00
SOFTWARE ARTS	
TK Solver	240.00
SPECTRUM HOLOBYTE	
Gato	28.00

Accessories

AST	
Six Pack Plus (64K)	285.00
Mega Plus II (64K)	345.00
Combo Plus II	285.00
I/O Plus II	Call
CHALKBOARD	
Power Pad	Call
Starter Kit	Call
ELEPHANT	
Flip N File	20.00
HERCULES	
Color Graphics	189.00
Monochrome Graphics	354.00
KENNINGTON	
PC Saver	40.00
Micro Saver	59.00
KEYTRONIC	
Keyboard 5150	150.00
KB 5151	189.00
KB 5151 Dvorak	189.00
KOALA	
Koala Pad	89.00
KRAFT	
Joystick	Call
MICROSOFT	
Ram Card 356K	385.00
System Card 64K	295.00
System Card 256K	450.00
Mouse	145.00
PERSYST	
Color Graphics Board	235.00
Monochrome Board	245.00
PLANTONICS	
Color +	Call
QUADRAM	
Quadlink	475.00
Quadboard I	215.00
Quadboard I (64K)	275.00
Quadboard II	215.00
Quadboard II (64K)	Call
Quad 512 (64K)	285.00
Quad Color I	215.00
Quad Color II Upgrade	199.00
STB	
Super I/O	Call
Graphics Plus II	Call
Graphics Plus	Call
Rio-Plus (64K)	Call
SWEET ELECTRONICS	
Echo for IBM	Call
TG	
Joystick	Call
TALLGRASS	
Hard Disk	Call
THUNDERWARE	
Thunderclock	Call
TITAN	
Accelerator PC	759.00

Call on
IBM
Computers

Business

ALPHA	
Database Manager II	179.00
APPLIED SOFTWARE TECHNOLOGY	
Versalorm	235.00
ASHTON TATE	
Friday	199.00
d Base II	289.00
d Base III	Call
AXX MICRO	
AP/AR/GL/Inv/PR	89.285.00
BPI	
General Accounting	385.00
AR/AR/Inv/PR	89.385.00
BEST PROGRAMS	
PC/Personal Finance Program	85.00
BIMBI	
The Word	129.50
CHANG LABS	
File Plan	190.00
Graph Plan	190.00
Memo Plan	190.00
Starter Kit (Memo/Graph/File)	487.00
CONTINENTAL SOFTWARE	
Home Accountant Plus	89.00
Property Management	329.00
FCM	79.00
The Tax Advantage	45.00
DIGITAL RESEARCH	
CPM/86	36.00
C Compiler (PC Dos)	218.00
Dr. Logo	84.00
DOW JONES	
Market Analyzer	225.00
Market Manager	183.00
FINANCIAL INC.	
Financier II	114.08
Tax Series	95.00
FOX & GELLER	
D Utility	54.00
Quickcode	145.00
FUNK SOFTWARE	
Sideways	40.00
HAYDEN	
Pie Writer	129.00
The Writer	34.00
The Speller	34.00
The Calendar	34.00
HOWARD KOFF	
Real Estate Analyzer II	185.00
INFORMATION UNLIMITED	
Easy Speller II	87.00
Easy Mailer II	87.00
Easy Writer II System	Call
LIFETREE SOFTWARE	
Volkswriter Deluxe	154.00
LIVING VIDEOTEXT	
Think Tank	119.00
LOTUS DEVELOPMENT	
1-2-3/Symphony	Call
MAIN STREET SOFTWARE	
Main Street Filer	179.00
MECA	
Managing Your Money	118.00
MICROPRO	
Wordstar Packages	Call
MICROMIM	
R base 4000	275.00
Clout	124.00
MICROSOFT	
Multiplan	124.00
Word	245.00
Word With Mouse	285.00
MICROSOFT	
Crosstalk XVI	185.00
MONOGRAM	
Dollars & Sense	95.00
PBL	
Personal Investor	99.00
PEACHTREE	
Peach Pak (GL/AR/AP)	185.00
PEARLIFT	
Personal Pearl	181.00
Accounting Pearl	580.00
PROFESSIONAL SOFTWARE	
Word Plus	Call
Word Plus Jr	Call
Word Plus With The Boss	Call
SOFTWARE PUBLISHING	
PFS Report	79.00
PFS Write	79.00
PFS Graph	79.00
PFS File	81.00
SORCIM	
Super Calc II	149.00
Super Calc III	210.00
Superwriter	181.00
VISCORP	
Visi Packages	Call

If something you would like is not listed, just call. For inquiries and Connecticut orders call (203) 268-1850



For Fast Delivery send cashier's check, certified check or money order. Personal and company check allow 3 weeks to clear. Shipping - Software (\$2.50 minimum) C.O.D. add an additional \$1.75. Shipping - Hardware (please call). Alaska, Hawaii, Canada, PO, APO and FPO \$5.00 minimum. Foreign orders - \$15.00 minimum and 15% of all orders over \$100. Mastercard & Visa (include card # and expiration date). Connecticut residents add 7.5% sales tax. We ship same day for most orders. Prices subject to change without notice. School purchase orders accepted. All returns must have a return authorization number. Call 203-268-1850 to obtain one before returning goods for replacement.

ORDERS ONLY - TOLL FREE
7 DAYS/WK 9AM to 9PM EST
1-800-382-2242

no flicker, and writing speed was fast in either mode. The DOS MODE switched between monitors as claimed.

STB provides three special drivers for Lotus's *1-2-3* to implement full-screen high-resolution monochrome graphics, 16-color medium-resolution graphics, and 4-color high-resolution graphics. All worked correctly and produced impressive results. Monochrome graphs were produced with excellent speed and resolution, and the two color modes generated lovely *1-2-3* graphs. The medium-resolution 16-color mode was especially appealing.

A parallel printer port is standard equipment on the Graphix Plus II. A ribbon cable and rear panel connector are supplied, and the port worked as I expected. The port address cannot be changed—a minor inconvenience. An optional clock/calendar with battery backup can be installed easily, but STB did not provide one with my sample.

Warm and Safe

STB also includes a copy of its excellent *PC Accelerator* software. Basically a RAM disk and print spooler program, *PC Accelerator* has many unique features that make it one of the most desirable programs of its type. With it, for example, you can warm-boot the PC without losing the contents of a RAMdisk! *PC Accelerator* is best used with STB's own memory boards, but many of its features work quite well with my AST MegaPlus multifunction card as well.

The STB Graphix Plus II is easy to install and use, works well, and is reasonably priced. I wish the monochrome graphics were compatible with Hercules; the manufacturers of several of the boards examined in this project seem to think the only program in the world is *1-2-3*. The same goes for the enhanced color options, which would be more useful if they were compatible with Plantronics protocols. Nevertheless, the Graphix Plus II is a trouble-free, well-designed, and well-executed adapter card that deserves careful consideration.—G.A.H.

C.C.S. SUPERVISION

SuperVision is a very flexible monochrome video adapter produced by California Computer Systems. It offers a choice of various text configurations as well as two high-resolution graphics modes; one is compatible with the popular Hercules protocols, and the other emulates IBM color to be displayed on the monochrome monitor.

Installation is straightforward, requiring only that you set two switches to indicate whether the SuperVision should respond to information directed to the memory area reserved for monochrome, color, or both. Set Switch 1 on the PC motherboard to match and off you go. A serious glitch is that the preliminary manual gives incorrect switch-setting information. A text file on the software disk supplied with the unit had the correct settings, but it took some digging to unravel the mixup. The error has evidently been corrected in a new manual to be released as this is being written.

Misprints

Four distinct text display modes are available. In addition to standard 80-by-25, the SuperVision can also display 80 characters by 44 lines, 132 by 44, and 132 by 28. The 80-by-44 mode is excellent for word processing, while both 132-column modes are good for spreadsheets and word processing tables. CCS's literature mentions DEC VT and IBM 3278-05 compatibility, but this is misleading. The SuperVision does not emulate either terminal; it merely provides the 132-column hardware environment necessary for some software package (not supplied by CCS) to do the emulation. The literature also says that a full-screen editor that can use the 132-column modes is provided, but CCS no longer includes the editing program.

An optional graphics adapter allows

graphics display to emulate the Hercules monochrome graphics card. There is also a graphics mode which is a *partial* emulation of IBM color graphics displayed on the monochrome monitor. Many programs designed to use the IBM color mode will run on the SuperVision, but many others will not. Programs that have been modified to generate Hercules mono graphics all work correctly.

The rear of the board has the nine-pin connector for the monochrome monitor (you cannot connect the SuperVision to a color monitor) and a standard 25-pin connector for the parallel printer port, included as standard equipment.

Two initialization files are provided to insert into the user's AUTOEXEC.BAT file. One sets the board for the various text options, and the other allows graphics operation.

Switching among text modes is done with programs supplied by CCS. MODE8044 switches to 80-by-44 text, MODE132 changes to 132-column-by-44-line display, etc. Here another documentation error occurs: the 132-by-28 program is called M13228.COM in the manual, but the actual program is named M132BY28.COM.

Performance in all the text modes is excellent. Each of the four possible modes has its own font, with the normal 80-by-25 mode using the standard IBM monochrome font. The 132-by-44 font is essentially the same as those used by the other boards reviewed in this project that offer that mode, but the 80-by-44 and 132-by-28 fonts are unique. Both are very readable and would be usable over long periods of time. CCS claims that the SuperVision design does not produce any screen glitches during updating, and my tests confirmed this claim. Writing to the screen is fast and clean in any text mode, with no snow or rippling during scrolling.

Application-Friendly

The Hercules graphics mode worked perfectly with *1-2-3*, *AutoCad*, and *Microsoft Word*. CCS provides special drivers

VIDEO BOARDS

for 1-2-3 graphics, which also worked immediately, but the graphs produced were not as detailed as with the Hercules mode. The optional graphics extender piggyback board is required for either graphics mode; so I see no reason to use anything but the Hercules mode, unless the software in use does not support Hercules graphics.

CCS also provides patching instructions for *WordStar 3.3*. You merely change the screen width and height locations within *WordStar* using the patching provisions hidden in the standard MicroPro WINSTALL program (DEBUG would also work fine). Patched *WordStar* worked well in all the text modes, with the 80-by-44 mode being particularly desirable.

Instructions and files to patch Microsoft's *MultiPlan* spreadsheet were included. This process is far more complicated, but batch files on the disk automated the procedure nicely. Running a spreadsheet in 132-by-44 mode is truly useful. For example, a full year of monthly data can often be displayed as a unit. The SuperVision card worked smoothly with the patched *MultiPlan*.

CCS indicated patches for 132-column operation with 1-2-3 will be available by the time this article appears. The disk the company supplied also included sample BASIC programs you can incorporate into your own BASIC programs to change the display mode of the SuperVision. These worked as advertised and changed the size and font used, but IBM BASIC won't allow a display larger than 25 lines.

CCS claims that the SuperVision can coexist with a color board in the system. This is true only if the SuperVision is configured as a purely monochrome card. If you want graphic from it, you can't have a color card in the system; that's true with most Hercules-compatible cards.

Despite a few inconsistencies or errors in the manual (which was, after all, preliminary) and literature, the SuperVision works very well. It is one of the most desirable boards available for mono-

chrome use. Its four text modes are useful, especially with the patches provided by CCS for popular applications software. The Hercules graphics mode adds a powerful dimension to software designed for mono graphics. No other board offers the unique combination of attributes available with the SuperVision. CCS has produced a most attractive product.—G.A.H.

TECMAR GRAPHICS MASTER

The Graphics Master is an extremely versatile tool. But throughout the card's development, much of that versatility has been bought at the price of inconvenience. Under the Graphics Master's old software/documentation regime, the manual gives no fewer than 15 jumpering configurations just to cover using the board with various monitors or in combination with other cards and monitors in multiple-display setups. That appears to have been simplified to some extent by new documentation and software, but the jumpering is still something of a nuisance you have to learn to live with if you're going to use a Graphics Master.

Still, I can't be too critical of the required jumpering, because it seems to play a key role in the Graphics Master's ability to take on so many different looks with different monitors and applications—sort of the Lon Chaney, Jr., of video boards. At least one key jumper has to be in a position different from the old configuration for the new software to even work with the Graphics Master board.

While the Graphics Master is still the same old board physically, with the new software it does behave in some very different ways. One of my biggest gripes with the Tecmar board had always been

that to switch from using a monochrome monitor to an RGB you had to open up the computer, remove the board for rejumping, and then put it all back together—a royal pain in the you-know-what.

Now, however, monitor changes can be done without rejumping, simply by switching the toggle on the bottom of the slot bracket. After typing in the software switching command, you have to unplug the monitor you had been using before you hit the enter key, so that while the switching is actually taking place, you momentarily have no monitor connected at all. But by the time you're ready to plug your other monitor in, the board's ready for it, so the switch is really quite painless.

As Close as Your Keyboard

The new Tecmar GMBIOS software brings a number of other options within easy reach, too, via simple keyboard commands. You can use it to change foreground/background color attributes while a program is running, shift the display around on the screen, and check or change various parameters.

Another nice feature of the new software is a screen-saver switch that automatically blanks the screen if you don't do anything with it for about 5 minutes. As soon as you hit any key, the display comes back up, and you're right where you left off.

The Graphics Master board has always had a 128K video buffer standard on the card, but with the new software, it's able to use it in some new ways. One of the more interesting of these is the ability to access up to 32 pages of monochrome text, 8 pages of four-color graphics, or some combination divided between monitors. And you can do this by means of a few simple keystrokes using the new GMBIOS software.

At the moment, that feature seems to be more of a teaser than something really useful, however. The problem now with the screens already sent to the buffer is that, while you can write to any of them on powerup, once you call up an applications

COLOR 400

SIGMA DESIGNS' new Color 400™ makes your PC an electronic canvas. Color 400 . . . a revolutionary board for the IBM PC*, XT* and AT*. With a 640x400 resolution in non-interlaced mode, it automatically **DOUBLES** the number of displayed lines on standard, 200 line software. Gives you 16 vibrant colors in WordStar*. Keeps numbers and characters razor sharp in Lotus 1-2-3*, SuperCalc*, and others. And provides all points addressable graphics capability!

Voilà

All you have to do is plug it in. There's no software to change. No switches to switch. No cables to confuse. Just turn on your PC. Then tune into a whole new colorful world of illustration: figures, charts, graphs and symbols.

Be an artist. With PC Paint† and a PC Mouse†, you can: Paint. Draw. Shade. Print. Type. Underline. Change Fonts. Bold Face.

Cut. Paste. Publish. Dress up slides with presentation quality color. In a snap you can: Categorize. Subtotal. Total. Footnote. Quality. Cross

Tab. Extend . . . and more, in a variety of highlighted colors to make spreadsheets and charts take on a new, explosive meaning.

And for maximum performance, use the Color 400 with a high resolution monitor like SIGMA DESIGNS' new CM-12™ or the Princeton Graphics' SR-12*. So, ask to see a live demonstration of the Color 400 at your nearest dealer.

If you don't find us at your local store, call or write for the one nearest you.

CIRCLE 157 ON READER SERVICE CARD



**SIGMA
DESIGNS**

SIGMA DESIGNS, INC.
2023 O'Toole Avenue
San Jose, CA 95131
(408) 943-9480
Telex: 171240

†PC Paint and PC Mouse are trademarks of Mouse Systems. Both are available with the Color 400 at an extra cost of \$100 when purchased all together (a \$200 savings).

*IBM PC, XT, AT are trademarks of IBM Corp. WordStar, Lotus 1-2-3, SuperCalc and Princeton Graphics SR-12 are respective trademarks of Micro-Pro, Lotus, Sorcim and Princeton Graphics.

The PC Plotter: It will change the way business looks at graphics.

The lowest-priced professional plotter on the market today is Houston Instrument's new four-pen PC Plotter. It is designed to produce the crisp graphics you need to compete — and communicate — in business. Just what makes this plotter so competitive? Let's take a look:

Price — A multi-pen, compact, single-sheet plotter at \$595* isn't just a low price — it's an unbelievably low price. What an affordable way to link the power of graphics communication to your personal computer.

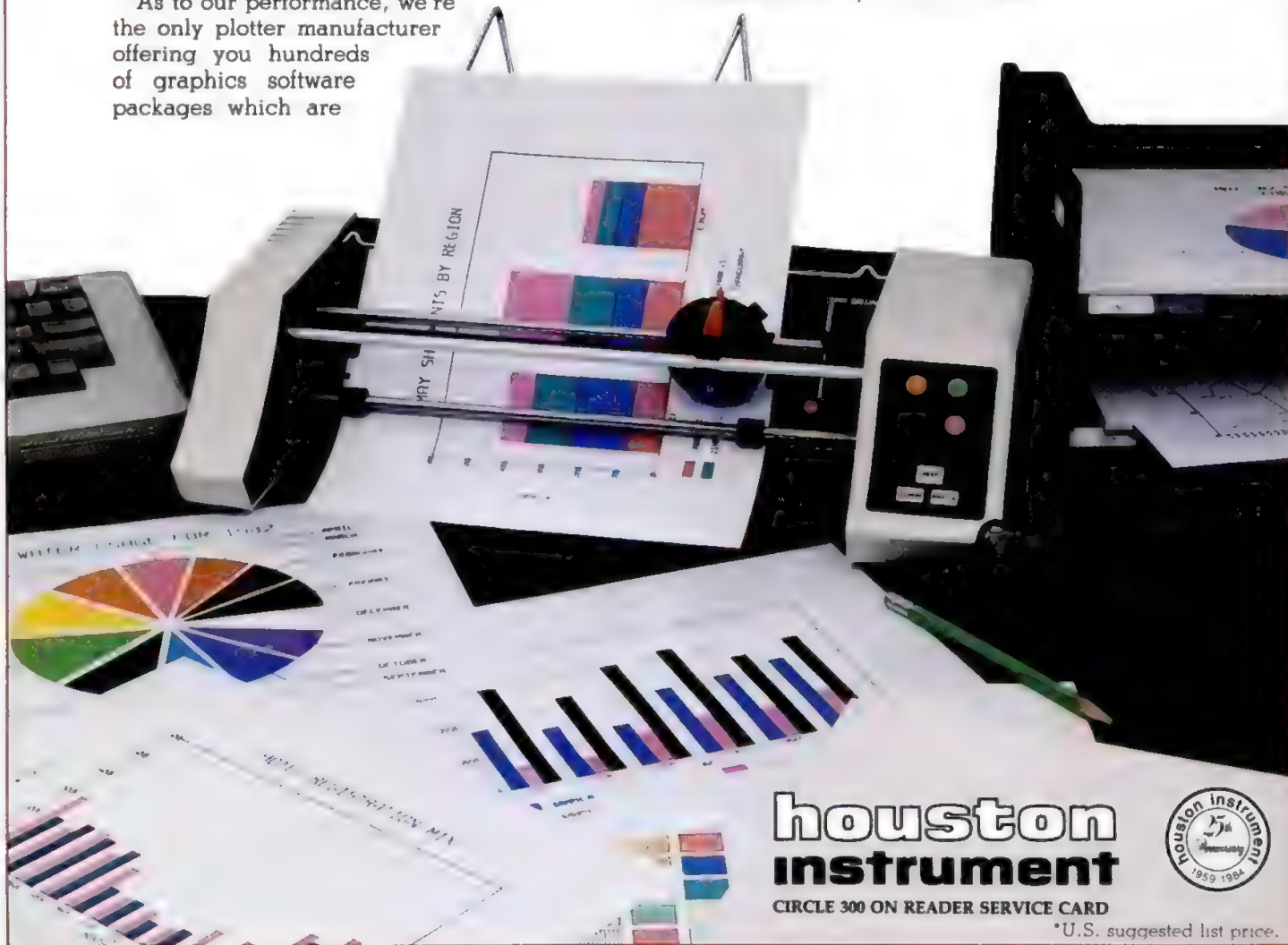
Performance — Yours and Ours — Until the PC Plotter was born, it was too expensive to let the pictures do the talking. Now that's no longer true. So, the next time the boss walks into the office needing some "nice charts and graphs," you can quickly fill the request with clean, colorful, wonderful graphics. Who knows, you might even get a raise!

As to our performance, we're the only plotter manufacturer offering you hundreds of graphics software packages which are

compatible with the PC Plotter. That means you can produce any type of drawing you require.

Flexibility — Depending on your needs, you can select from two PC Plotter models. One (PC Plotter Model 595 for \$595.00*) allows you to produce graphics or overhead transparencies on 8½" x 11" paper or film; the other (PC Plotter Model 695 for \$695.00*) permits either 8½" x 11" or 11" x 17" graphics. And we didn't forget the OEM. Houston Instrument will work with you to configure a plotter that's perfect for your particular application.

For the name of your closest PC Plotter distributor or dealer, contact Houston Instrument, P.O. Box 15720, Austin, Texas, 78761 or call (512)835-0900. Outside Texas call 800-531-5205. In Europe, contact Houston Instrument, Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel. 059-27-74-45, Tlx. 846-81399.



**houston
instrument**

CIRCLE 300 ON READER SERVICE CARD



*U.S. suggested list price.

VIDEO BOARDS

program, you can access them only to look at what they already contain. You can even print the contents of any or all of them using the PrtSc function. But as long as your applications package is in use back on page 1, you cannot write to any other page—at least not with the Tecmar software I had to work with. That precludes the animation effects you could create if it were possible to switch back and forth among pages, displaying one while writing another and then displaying the new written page.

The Tecmar Graphics Master is just a little ahead of its time, perhaps with features no one has applications for yet.

Off in the Future

A conversation with one of Tecmar's technical support people seemed to confirm that this feature is just a glimpse at a yet-unrealized potential. So once again, the Graphics Master is just a little ahead of its time, perhaps with features no one has applications for yet. It's a little like putting a mouse in your system before the applications people make special accommodations for it in their software.

The Graphics Master has always been one of the most versatile and most advanced but also most complicated video boards to work with. It is still one of the most versatile, perhaps now a little more so than ever. But Tecmar has made it a lot easier to work with, and that certainly makes it a more attractive choice than ever before. Even if it is still a little ahead of its time.—J.F.

TSENG ULTRAPAK BOARD

The largest sellers among IBM expansion boards are multifunction cards. These products usually focus on memory expansion, with a clock/calendar with battery backup and serial and/or parallel ports often included. Tseng Laboratories of Newtown, Pennsylvania, has designed a multifunction board that centers on video rather than on memory. The UltraPAK card replaces the IBM monochrome adapter, but it also provides expanded video functions, a clock/calendar, and I/O ports.

Only two jumpers need setting before installing the board. The first indicates if the optional second serial port hardware is present. The other enables both graphics pages available on the board if the UltraPAK is the only video board in the system. If a color board is also in the system, you must disable the second graphics page, since the color board uses this memory space.

This problem will sound familiar to owners of Hercules monochrome graphics boards, and indeed, the UltraPAK does feature Hercules-compatible graphics. As with a standard Hercules board, the UltraPAK cannot coexist with a color board on the same motherboard. Unlike the Hercules, the UltraPAK can display the output of most color programs on a monochrome monitor.

On the Big Screen

The UltraPAK's other claim to video fame is 132-column-by-44-line text. A program called BIGSCR seems to patch DOS to allow display of more than 25 lines at one time, a feat not matched by the Everex Graphics Edge 132-by-44 mode. Since BIGSCR has no effect on normal operations, it is easiest to include it in the AUTOEXEC.BAT file so it is invoked

when the system is started.

A clock/calendar is standard on the UltraPAK, as is a battery to keep the clock running when power to the PC is off. Tseng provides SETCLOCK to set the date and time and RDCLOCK to load the PC with the data. Putting RDCLOCK in AUTOEXEC.BAT will provide automatic time and data stamping without the user having to answer the DATE and TIME prompts usually displayed when DOS wakes up.

Tseng also supplies RAMdisk software to set up an area of memory as a disk emulator. Most such software is executed directly from DOS, with parameters specifying the size of the disk and other factors. The Tseng software, however, uses a device driver named MEMDSK.DEV, which is installed into DOS through CONFIG.SYS. A utility called SZEMDSK modifies MEMDSK so that it creates a RAMdisk of any size up to 360K. While the Tseng method works, it is more awkward and somewhat less flexible than the normal methods.

The UltraPAK features one serial port and one parallel port as standard equipment. A second serial port can be added. A small connector bracket similar to AST's ConnectAll is provided so that the connections at the rear of the PC can be neat.

Kudos and Oddities

The video performance of the UltraPAK is exemplary. The standard IBM text mode is as fast as with an IBM board, and Hercules graphics mode is fast and snow-free with *1-2-3*, *AutoCad*, and *Microsoft Word*. The characters in 132-column mode are, of necessity, small, but they're easily readable. Tseng's patch to allow 44 lines of 132 characters from DOS is helpful, but it doesn't work with BASIC. Loading BASIC while in 132-column mode results in the common 25-line BASIC display, but in tiny, 132-column-mode characters. Even stranger, the cursor becomes a blinking underlined *u* with an umlaut. Odd, but of no impact whatsoever in normal operation.

Basic Dot Matrix printing just got better.

DATA MANAGEMENT SYSTEM - SORT BY CUSTOMER NO.
SHIP TO CUSTOMER MASTER
SHIP TO:
TERRITORY
SHIP TO CUSTOMER NO.
111129
ZIP CODE
95051
Bill Wayne, Inc
6102 4th Street
600

Thanks to Fujitsu, now there's a basic, economical dot matrix printer that's everything but basic.

The DotMax 9 is flexible—flexible enough to adapt to most of your basic printing needs. It produces near letter quality, high-density printing at a 25-character-per-second rate. Or draft-quality documents at a rapid, 180 cps clip. A wide variety of character sets are also standard.

The DotMax 9 is uniquely affordable when compared with other 9-wire head dot matrix printers. But with the DotMax 9

DotMax 9™



you'll never have to buy additional forms handling devices. Both a tractor feed for continuous forms and a friction feed for single sheets are built right in.

The DotMax 9 is from Fujitsu. For over 30 years we've been a technology leader and equipment supplier to companies worldwide. Rugged reliability is our hallmark. Quality and value are our trademarks. Don't settle for just the basics when you can have a DotMax 9.

Contact your local distributor or call 1-800-626-4686 for the dealer nearest you.

Fujitsu Printers

Maximum Quality. Maximum Value.



CIRCLE 300 ON READER SERVICE CARD

DotMax 9 is a trademark of Fujitsu America, Inc.

FIRST CHOICE

PC, The Independent Guide To IBM Personal Computers

PC is the only magazine that keeps you up-to-date with the newest trends, innovations, and releases in IBM and compatible personal computer technology. Every-other-week, you'll receive the most current news on how other users and professionals like yourself are using their IBM PC...you'll discover the newest hardware on the market and what it promises (and actually delivers) to you and your system...and you'll never be out-of-date with the newest releases in software.

In short, when you subscribe to PC you're subscribing to the one magazine most IBM PC users read to maximize their system.

If you're a very special person who uses an IBM PC or compatible, you owe it to yourself to subscribe to PC, your source for new ideas, information and innovations.

ACT TODAY AND SAVE UP TO 26% AND GET UP TO 8 BONUS ISSUES!



FOR NEW IDEAS, INFORMATION & INNOVATIONS...

YES,

Check one:

- ☐ Payment enclosed
☐ Bill me later

Charge my:

- ☐ American Express
☐ Visa ☐ MasterCard

Card No. _____

Exp. Date _____



P.O. Box 2443, Boulder, Colorado 80322

PC4Z163

I'm a very special person that uses an IBM PC. Please enter my subscription to PC for:

- ☐ 20 Issues for \$21.97! Less than \$1.10 a copy! AND ADD 4 BONUS ISSUES!
☐ 40 Issues for \$39.97! Less than \$1.00 a copy! AND ADD 8 BONUS ISSUES!
Savings based on a single copy price of \$2.95 an issue.

Mr./Mrs./Ms. _____
please print full name

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Please add \$2 per copy for postage in Canada and all other foreign countries. Allow 30 to 60 days for delivery of first issue. Your subscription may be tax deductible—please check with your accountant.

VIDEO BOARDS

Tseng offers various piggyback boards that plug into the UltraPAK. The sample UltraPAK supplied by Tseng had a 384K memory expansion board plugged in, but the system would not boot with it in place. Since no documentation was provided for the memory expansion, I simply disconnected the piggyback for these tests. Other options include a floppy disk controller and a combination card that includes the floppy controller and up to 256K of RAM.

Overall, the UltraPAK proved to be a desirable product. Its video section worked beautifully, and the inclusion of a clock/battery and serial and parallel I/O on a video board is an interesting alternative to the common memory/clock/I/O multi-function board.—G.A.H.

APPLIED DATA VECTORSCAN 512

The VectorScan 512 is a high-resolution graphics controller. Unlike all the other products reviewed in this series, which are plug-in cards for the IBM Personal Computer and compatibles, the VectorScan is a freestanding device that you can use with any computer that has a serial port. It includes an 8085 8-bit microprocessor, graphics firmware, and the same Motorola 6845 CRT controller used on many PC display adapters. It takes its input from the host computer and displays the images it generates on a normal RGB monitor, composite color monitor, or monochrome monitor.

The VectorScan includes a standard Centronics-compatible parallel printer port and commands to use some of its 64K, 96K, or 128K display memory as a print queue. In addition, a connection for a serial terminal is provided. This last port

allows the VectorScan to be inserted between a computer and its terminal. In this case, special commands notify the VectorScan that graphics commands are

Two banks of jumpers on the internal VectorScan board determine the baud rate and data parameters.

being issued; otherwise, the terminal and computer communicate normally without noticing that the VectorScan is there.

Everything-Compatible

In a series devoted to evaluating PC video adapters, why are we looking at a device that isn't a PC plug-in video card? Two reasons. First, there's something to be said for a graphics machine that you can use with any computer. Many installations have some combination of older 8-bit computers, PCs, and/or larger computers. The VectorScan can be moved from one computer to another easily, and it is also easy to drive over a telephone line via a normal 300- or 1200-baud modem.

Second, Applied Data Systems, the manufacturer of the VectorScan, indicates that the single board in the VectorScan will be redesigned as a PC plug-in; the performance of the PC plug-in should mirror that of the freestanding VectorScan, except that the native PC version should run somewhat faster because data will be sent to it internally rather than over a relatively slow serial link.

Installing the VectorScan is prone to all the difficulties usually experienced in interfacing a serial device. Two banks of jumpers on the internal VectorScan board determine the baud-rate and data-word parameters that will be used. The host computer obviously has to use the same

settings. The DOS MODE command works well, and at least there is no idiosyncratic cabling requirement.

The VectorScan 512 display is 512 pixels wide by 480 pixels high. It's available in versions to display 4, 8, and 16 colors and gray scales from a palette of 16 colors (depending on whether 64K, 96K, or 128K of display memory is installed). The firmware supports drawing of points, lines, and circles and arcs; filling of specified areas or the entire screen; display of text either horizontally or vertically, and so on.

The VectorScan commands are normal ASCII text, which can be sent to the device interactively or from a BASIC or other high-level language program. The commands are three-letter codes followed by whatever parameters are necessary. For example, "CIR 100 100 20" draws a circle at location 100,100 with a radius of 20.

I tested the VectorScan with both an IBM PC and an IMS 8000 CP/M computer. The monitor I used was a Sony CPD. Interfacing was reasonably straightforward once the internal jumpers were set correctly. It would be more convenient, though, if Applied Data brought the jumpers out to two DIP switches on the back panel.

Line Try

The system came up immediately, with the VectorScan attempting to display a status line at the bottom of the screen and a graphics cross-hair cursor in the middle of the display. I say "attempted" because the status line was positioned slightly too low to be seen fully. Perhaps the 480 lines the VectorScan produces are simply too many for a normal RGB monitor designed for use with the PC display. I could not adjust the size of the Sony; so I tried a Princeton Graphics HX-12, with similar results.

The display produced by the VectorScan is impressive. Colors are deep and saturated, and resolution is good. Writing speed seemed quite fast in some cases, but less so in others (area fill of a large area

was sluggish, for example). A rather severe snow effect appeared when the screen was cleared, but not when images were being produced. The sample programs Applied Data provided me with produced detailed bar graphs, geometric patterns, scientific graphs, and other appealing displays. The code which produced the displays was long and required specifying various locations and vectors, but it didn't seem much worse than what might be required to produce the same results in BASICA. Programming complex graphics is no picnic in any language, and in some ways, the VectorScan method is clearer than the statements required in BASICA.

Creating detailed color graphics is far less common on S-100 and other CP/M machines, primarily because of the lack of hardware standardization. In this environment, the VectorScan is an attractive product. How the PC card version will stack up against the competition reviewed in this series is more difficult to assess.

In any event, the VectorScan is a good product that does what it claims. There's

Programming complex languages is no picnic, but in some ways the VectorScan method is clearer than the statements required in BASICA.

little likelihood that any commercial software will be produced for the VectorScan, but Applied Data Systems will create custom software on a paid basis. If you can write programs to meet your needs, or if you need graphics on a variety of machines, the VectorScan may be the answer.—G.A.H.

VIDEO BOARD MANUFACTURERS

Supervision

California Computer Systems
250 Caribbean Dr.
Sunnyvale, CA 94089
(408) 734-5811

List Price: \$599 w/graphics; \$499 without graphics.

CIRCLE 695 ON READER SERVICE CARD

Graphics Pacer

Everex Systems, Inc.
891 Maude Ave.
Mountain View, CA 94043
(415) 967-1111

List Price: \$489

CIRCLE 694 ON READER SERVICE CARD

UltraPAK

Tseng Laboratories, Inc.
Newtown Industrial Commons
205 Pheasant Run
Newtown, PA 18940
(215) 968-0502

List Price: \$680

CIRCLE 693 ON READER SERVICE CARD

Colormax

Micromax Systems, Inc.
6868 Nancy Ridge Dr.
San Diego, CA 92121
(619) 457-0311

List Price: \$499.95

CIRCLE 692 ON READER SERVICE CARD

Graphics Edge

Everex Systems, Inc.
891 Maude Ave.
Mountain View, CA 94043
(415) 967-1111

List Price: \$499

CIRCLE 691 ON READER SERVICE CARD

MicroGraphics I

MicroGraphics Technology
1820 McCarthy Blvd.
Milpitas, CA 95035
(408) 996-8423

CIRCLE 690 ON READER SERVICE CARD

IDEAgraph

IDEAssociates, Inc.
35 Dunham Rd.
Billerica, MA 01821
(617) 663-6878

List Price: \$995 for 24 MHz w/128K;
\$1345 for 24 MHz w/256K;
\$1495 for 40 MHz w/128K;
\$1895 for 40 MHz w/256K.

CIRCLE 689 ON READER SERVICE CARD

Graphics Plus II

STB Systems, Inc.
601 North Glenville
Richardson, TX 75081
(214) 234-8750

List Price: \$495

CIRCLE 688 ON READER SERVICE CARD

MULTIGRAPH

Profit Systems, Inc.
30150 Telegraph Rd.
Birmingham, MI 48010
(313) 647-5010

List Price: \$499

CIRCLE 687 ON READER SERVICE CARD

Color 400

Sigma Designs, Inc.
2023 O'Toole Ave.
San Jose, CA 95131
(408) 943-9480

List Price: \$795; \$895 w/PC Paint Software & Optical Mouse.

CIRCLE 686 ON READER SERVICE CARD

color?

dBASE III

NEW

QUICKREPORT™

dBASE Report Generator

- Prints *any kind* of report or form
- Up to **6 databases** per report!!
- Incredibly easy to use
- No programming required

QUICKCODE III™

dBASE Program Generator

- Create CMD files *automatically*
- Data entry screens
- Data input error checking
- Computed fields & totals
- Link up to 8 databases!

Why write programs yourself?
Let QUICKCODE III do it!

dGRAPH III™

dBASE Graphics System

- Pie, line, bar charts
- Printer, plotter, or CRT
- Many automatic features

dUTIL III™

dBASE Program Utility

- Finds program errors
- Improves code
- Saves time

—Versions available for dBASE II—

**INFORMATION
HOTLINE**

800-221-0156

FOX & GELLER

Fox & Geller, Inc. 604 Market St., Elmwood Park, N.J. 07407

dBASE II and dBASE III are trademarks of Ashton-Tate.
QUICKCODE and QUICKCODE III are trademarks of Fox & Geller, Inc.

CIRCLE 246 ON READER SERVICE CARD

Video Board Manufacturers continued

Dazzler I

Sigma Designs, Inc.
2023 O'Toole Ave.
San Jose, CA 95131
(408) 943-9480

List Price: \$895

CIRCLE 685 ON READER SERVICE CARD

DAZZLER II

Sigma Designs, Inc.
2023 O'Toole Ave.
San Jose, CA 95131
(408) 943-9480

List Price: \$995

CIRCLE 684 ON READER SERVICE CARD

Quadcolor II

Quadram Corporation
4355 International Blvd.
Norcross, GA 30093
(404) 923-6666

List Price: \$569

CIRCLE 683 ON READER SERVICE CARD

Quadcolor I

Quadram Corporation
4355 International Blvd.
Norcross, Ga 30093
(404) 923-6666

List Price: \$275

CIRCLE 682 ON READER SERVICE CARD

BoB Board

Emulex-PERSYST
3545 Harbor Blvd.
Costa Mesa, CA 92626
(714) 660-1010
(714) 662-5600 (Marketing)

List Price: \$595

CIRCLE 681 ON READER SERVICE CARD

PC Peacock

MA Systems, Inc.
2015 O'Toole Ave.
San Jose, CA 95131
(408) 943-0596

List Price: \$249

CIRCLE 680 ON READER SERVICE CARD

CX-1 Color Transformer

Discortex Corporation
87 Bethpage Road
Hicksville, NY 11801
(516) 935-5538

List Price: \$295; requires standard 4-
or 16-color graphics card.

CIRCLE 679 ON READER SERVICE CARD

VectorScan 512

Applied Data Systems, Inc.
9811 Mallard Dr. #213
Laurel, MD 20708
(301) 953-9326

List Price: \$975

CIRCLE 678 ON READER SERVICE CARD

INNOVATION

Bronson Electronics Corp.
12700 Nicollet
Burnsville, MN 55337
(612) 894-6466

List Price: \$244

CIRCLE 677 ON READER SERVICE CARD

Hayes sets the standard for personal computer communications. Again. Smartmodem 2400.™



The new fast mover from Hayes. The telecomputing leader. When it comes to communications products for personal computers, we're the leader! Hayes Smartmodem 1200™ set the industry standards for quality, reliability and performance.

Now our new, faster Smartmodem 2400 goes even further to lower telephone line costs and improve user productivity. So, at twice the speed of a 1200 bps modem, it quickly pays for itself in any high-volume communications operation.

Smartmodem 2400 provides a quick link to minis and mainframes. Both synchronous and asynchronous transmissions are supported by an advanced version of the well-known Hayes "AT" command set. You can download from the IBM mainframe at the home office. Send data to the mini upstairs. And guarantee accurate transmission with information services.

With worldwide communications in mind, Smartmodem 2400 was designed to meet CCITT international standards. It provides a fast, cost-effective way to transmit data between approved countries.

New version of Hayes Smartcom II® communications software creates a complete telecomputing system with Smartmodem 2400. Our new Smartcom II, Version 2.1, is available for the IBM® PC and many popular compatibles. Smartcom II makes the most of Smartmodem's exceptional features, at the same time it makes communicating easy for you. And, if you're currently using an earlier version of Smartcom II, Hayes offers a \$25 upgrade to Version 2.1.

So if you're looking for ways to streamline your communications, see your authorized Hayes dealer right away. For a hands-on demonstration of Smartcom II and our new Smartmodem 2400. Guaranteed to get you moving fast!

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/441-1617.

Smartmodem 2400

- Direct connect • Asynchronous and synchronous communications
- Accommodates Hayes-compatible modems of slower speeds
- Meets CCITT worldwide standards • Keyboard control of all communications parameters • High speed indicator • Voice/data capabilities • Call progress monitoring • Two-year limited warranty with optional four-year extended warranty available.

Smartcom II

- Hayes Verification and XMODEM protocols • Emulates DEC® VT52 and VT100/102 • Totally unattended operation • Voice/data capabilities.

Hayes®

Smartcom II is a registered trademark and Smartmodem 2400 and Smartmodem 1200 are trademarks of Hayes Microcomputer Products, Inc.
*Trademarks of their respective companies. ©1985 Hayes Microcomputer Products, Inc.

CIRCLE 165 ON READER SERVICE CARD

VIDEO BOARDS

COLOR CHART

PHYSICAL CHARACTERISTICS

Manufacturer and Model	Length	Single/ Double	Plug-In Modules	Slots Occupied	Output Jacks M-Mono C-Color CP-Com- posite	Light Pen	Cost	Compatibility	
								Standard IBM	P-Plantronics L-Lotus B-BASICA
Applied Data Systems, Inc. 9811 Mallard Dr. #213 Laurel, MD 20708 VectorScan 512	N/A	N/A	N/A	N/A	C, CP	No	\$975	No	No
Bronson Electronics Corp. 12700 Nicollet Burnsville, MN 55337 Innovation	Full	Single	No	1	C, CP	Yes	\$244	Yes	—
Discortex Corporation 87 Bethpage Rd. Hicksville, NY 11801 CX-1 Color Transformer	Short	Single	No	1	C, Analog	No	\$295	Yes	P,B
Emulex-PERSYST 3545 Harbor Blvd. Costa Mesa, CA 92626 BoB Board	Full	Single	Yes	1	C, CP	Yes	\$595	Yes	B
MA Systems, Inc. 2015 O'Toole Ave. San Jose, CA 95131 PC Peacock	Full	Double	No	1	C, CP	Yes	\$249	Yes	—
Quadram Corporation 4355 International Blvd. Norcross, GA 30093 Quadcolor I	Full	Single	Yes	1	C, CP	Yes	\$275	Yes	—
Quadram Corporation 4355 International Blvd. Norcross, GA 30093 Quadcolor II	Full	Double	Yes, Quad II is plug-in to Quad I	1	C, CP	Yes	\$569	Yes	B
Sigma Designs, Inc. 2023 O'Toole Ave. San Jose, CA 95131 Color 400	Full	Single	No	1	C	No	\$795	Yes, on high-scan monitor	L,B



IBM PC/XT Display Adapter Comparison

Special Driver	Resolution	Colors at One Time/Palette	Special Software R-Required S-Supplied	Special BASIC R-Required S-Supplied	Mono Display FS-Full Screen GS-Gray Scale	Monitor Required RGB/Analog/Phosphor/High-Scan	IBM Font Identical	Speed vs. IBM	Flicker
—	512 × 480	4, 8, or 16 from palette of 16	R	—	—	RGB or composite	No	See text	No
—	—	—	—	—	—	Std. IBM RGB or composite	Yes, also single dot font	Same	Severe
—	640 × 200	16 from palette of 262,144	R	S	—	Analog RGB	Adapter determined	Adapter determined	Adapter determined
—	640 × 200, 320 × 200 with optional memory	2 at 640 × 200, 4 at 320 × 200 from palette of 16	—	—	—	High Scan Rate RGB, NEC, TAX-AN, or composite	No, superior	Same	Moderate
—	—	—	—	—	—	Std. IBM RGB or composite	Yes, also single dot font	Same	Severe
—	—	—	—	—	—	Std. IBM RGB or composite	Yes	Faster	Moderate
—	640 × 300, and 640 × 200	136 at 640 × 300, 16 at 640 × 200	R/S CML driver and BASIC patch	S patches to BASIC A, creates BASIC Q	—	Std. RGB or composite	Yes	Same	Moderate
—	640 × 400	16 from palette of 16	No	No	—	High scan rate—PGS SR-12 type	No	Faster	No

VIDEO BOARDS

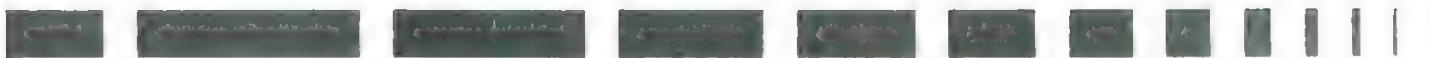
COLOR CHART

PHYSICAL CHARACTERISTICS

Manufacturer and Model	Length	Single/ Double	Plug-In Modules	Slots Occupied	Output Jacks M-Mono C-Color CP-Com- posite	Light Pen	Cost	Compatibility	
								Standard IBM	P-Plantronics L-Lotus B-BASICA
Sigma Designs, Inc. 2023 O'Toole Ave. San Jose, CA 95131 Dazzler I	Full	Single	Yes	1	C	Yes	\$895	No	—
Sigma Designs, Inc. 2023 O'Toole Ave. San Jose, CA 95131 Dazzler II	Full	Single	No	1	C	Yes	\$995	No	—

Mono + Color

Everex Systems, Inc. 891 Maude Ave. Mountain View, CA 94043 Graphics Edge	Full	Single	No	1	M,C,CP	Yes	\$499	Yes	Mono: L, Hercules Color: P,L
IDEAssociates, Inc. 35 Dunham Rd. Billerica, MA 01821 IDI Agraph	Full	Single	No	1	M,C, CP: optional	Yes	\$995 to \$1,895, depending on speed and memory	No	Custom only
Micromax Systems, Inc. 6868 Nancy Ridge Dr. San Diego, CA 92121 Colormax	Inter- mediate	Single	No	1	M,C,CP	Yes	\$499.95	Yes	Mono: B
Profit Systems, Inc. 30150 Telegraph Rd. Birmingham, MI 48010 MULTIGRAPH	Full	Single	Yes	1	1 for both M and C	No	\$499	Yes	Mono: L, Color: B
STB Systems, Inc. 601 North Glenville Richardson, TX 75081 Graphix Plus II	Full	Single	No	1	M,C,CP	Yes	\$495	Yes	L



Special Driver	Resolution	Colors at One Time/Palette	Special Software R-Required S-Supplied	Special BASIC R-Required S-Supplied	Mono Display FS-Full Screen GS-Gray Scale	Monitor Required RGB/Analog/Phosphor/High-Scan	IBM Font Identical	Speed vs. IBM	Flicker
---	640 × 200, 640 × 400 w appropriate monitor	16	S: drivers, demo	No	---	Std. IBM color for 640 × 200, High Scan Rate for 640 × 400	No, single dot	Same on text, graphics much faster	No
---	640 × 200, 640 × 400 w appropriate monitor	16	R,S (drives)	---	---	Analog RGB or Std. IBM RGB	No	Same on text, graphics much faster	No
No	Color: 640 × 200	16	R,S, utility to start color mode	---	GS-16	Std. IBM RGB IBM type monochrome	Yes	Same if no Wait state, slower with Wait state	Mono: none, Color: none to moderate depending on Wait state
No	Mono: 750 × 400, 1,024 × 256 at 512 × 512 to 1,024 × 1,024 palette of 4,096	4 at 1,024 × 1,024, 256 at 512 × 512	R	---	GS-16	Std. IBM RGB, composite, Analog RGB, High Scan Rate, and more	No	Faster	No
---	---	---	---	---	---	Std. IBM ROP or composite	Yes	Mono: same, Color: faster	No
Yes, for mono	Mono: 720 × 348, Color: std. IBM	---	Mono: R, S, Color: S (utility to reduce flicker)	---	---	Std. IBM RGB	Yes	Mono: same, Color: same, but faster with utility	Mono: none, Color: severe, but none with utility
Yes	Mono 640 × 350, Color 640 × 200 & 320 × 200	4 at 640 × 200, 16 at 320 × 200	R	---	GS in mono only	Std. IBM RGB	Yes	Mono same, Color: faster	No

VIDEO BOARDS

COLOR

PERFORMANCE			OTHER FEATURES					
Manufacturer and Model	White Snow/ Black Snow	132-Column Font	Memory			Serial Port		
			Performance Comments	Board Capacity	Plug-In Module	Cost	Clock/ Calendar	Number Standard
Applied Data Systems, Inc. 9811 Mallard Dr. #213 Laurel, MD 20708 VectorScan 512	Black snow	—	—	—	—	—	No	—
Bronson Electronics Corp. 12700 Nicollet Burnsville, MN 55337 Innovation	No	—	Same as IBM Color Adaptor including 'flicker'	—	—	—	No	—
Discortex Corporation 87 Bethpage Rd. Hicksville, NY 11801 CX-1 Color Transformer	Adapter dependent	—	—	—	—	—	No	—
Emulex-PERSYST 3545 Harbor Blvd. Costa Mesa, CA 92626 BoB Board	No	—	—	—	—	—	No	—
MA Systems, Inc. 2015 O'Toole Ave. San Jose, CA 95131 PC Peacock	No	—	Flicker!	—	—	—	No	—
Quadram Corporation 4355 International Blvd. Norcross, GA 30093 Quadcolor I	No	—	—	—	—	—	No	—
Quadram Corporation 4355 International Blvd. Norcross, GA 30093 Quadcolor II	No	—	—	—	—	—	No	—
Sigma Designs, Inc. 2023 O'Toole Ave. San Jose, CA 95131 Color 400	No	—	200-400 line doubler, com- patible w all IBM color monitors	—	—	—	No	—

Number Optional	Cost	Address Adjust	Parallel Port		Cost	Address Adjust	Game Port	Game Port Cost	Other Options and Costs
			Number Standard	Number Optional					
—	—	—	1	0	—	—	No	—	Memory for display
—	—	—	—	—	—	—	No	—	—
—	—	—	1	0	—	Yes	No	—	—
—	—	—	1	0	—	Yes	No	—	—
—	—	—	—	—	—	—	No	—	Extended graph- ics, \$200; down- loadable charac- ter set, \$100
—	—	—	—	—	—	—	No	—	Quadcolor II Graphics En- hancement, \$295
—	—	—	—	—	—	—	Yes	Standard	—
—	—	—	—	—	—	—	No	—	—

VIDEO BOARDS

COLOR

PERFORMANCE				OTHER FEATURES				
Manufacturer and Model	White Snow/ Black Snow	132-Column Font	Performance Comments	Memory Board Capacity	Plug-In Module	Cost	Serial Port Clock/ Calendar	Number Standard
Sigma Designs, Inc. 2023 O'Toole Ave. San Jose, CA 95131 Dazzler I	No	—	Fantastic! There's no substitute for fast hardware and lots of memory	—	—	—	No	—
Sigma Designs 2023 O'Toole Ave. San Jose, CA 95131 Dazzler II	No	—	Great!	—	—	—	No	—
Mono + Color								
Everex Systems, Inc. 891 Maude Ave. Mountain View, CA 94043 Graphics Edge	None in Wait state, moderate to severe with no Wait state	Yes, excel- lent legibility	Performance de- pendent on Wait. Generally excel- lent. Use with expansion chassis may be limited	—	—	—	No	—
IDEAssociates, Inc. 35 Dunham Rd. Billerica, MA 01821 IDEAgraph	No	—	—	—	—	—	No	—
Micromax Systems, Inc. 6868 Nancy Ridge Dr. San Diego, CA 92121 Colormax	Mono: mod- erate black Color: none	—	—	—	—	—	No	—
Profit Systems, Inc. 30150 Telegraph Rd. Birmingham, MI 48010 MULTIGRAPH	No	—	—	—	—	—	No	—
STB Systems, Inc. 601 North Glenville Richardson, TX 75081 Graphix Plus II	No	—	—	—	—	—	Optional, \$29.95	—



Number Optional	Cost	Address Adjust	Parallel Port		Cost	Address Adjust	Game Port	Game Port Cost	Other Options and Costs
			Number Standard	Number Optional					
—	—	—	—	—	—	—	No	—	Graphics Enhancement, \$695
—	—	—	—	—	—	—	No	—	—
—	—	—	1	0	—	—	No	—	—
—	—	—	—	—	—	—	No	—	—
—	—	—	1	0	—	Yes	No	—	—
—	—	—	0	1	\$65	Yes	No	—	—
—	—	—	0	1	—	No	No	—	Clock/ calendar, \$29.95

VIDEO BOARDS

MONOCHROME

PHYSICAL CHARACTERISTICS

Manufacturer and Model	Length	Single/ Double	Plug-In Modules	Slots Occupied	Output Jacks M-Mono C-Color	Light Pen	External Switches	Onboard Jumpers/ Switches	Cost
California Computer Systems 250 Caribbean Dr. Sunnyvale, CA 94089 Supervision	Full	Single	Yes	1	C	No	No	Switches	\$499; \$599 w/graphics
Everex Systems, Inc. 891 Maude Ave. Mountain View, CA 94093 Graphics Pacer	Full	Single	No	1	M	Yes	No	Jumpers	\$489
Tseng Laboratories, Inc. 205 Pheasant Run Newtown, PA 18940 UltraPAK	Full	Single	Yes	No, except with plug-ins	M	No	No	Jumpers	\$680

MONOCHROME

Manufacturer and Model	PERFORMANCE			OTHER FEATURES				
	Black Snow/ White Snow	132-Column Font	Performance Comments	Memory Board Capacity	Plug-In Module	Cost	Serial Port Clock/ Calendar	Number Standard
California Computer Systems 250 Caribbean Dr. Sunnyvale, CA 94089 Supervision	No	Yes	132 × 28 and 132 × 44; both readable	—	—	—	No	—
Everex Systems, Inc. 891 Maude Ave. Mountain View, CA 94043 Graphics Pacer	No	No	—	—	—	—	No	—
Tseng Laboratories, Inc. 205 Pheasant Run Newtown, PA 18940 UltraPAK	No	Yes	—	—	384K	64K, \$245; 384K, \$745	Yes	1



MONOCHROME						PERFORMANCE		
132-Column Display	Number of Lines	Resolution H-High M-Med L-Low	Compatibility H-Hercules L-Lotus B-BASICA	Special Software R-Required S-Supplied	Special BASIC R-Required S-Supplied	IBM Font Identical	Speed Vs. IBM	Flicker
Yes	44 or 28	H	H,L	R,S		Only in 80 × 25	Same	No
No	—	H	H,L	—	—	Yes	Same	No
Yes	44	H	H,L,B	—	—	Yes	Same	No

Number Optional	Cost	Parallel Port Address Adjust	Number Standard	Number Optional	Cost	Address Adjust	Game Port	Game Port Cost	Other Costs and Options
—	—	—	—	—	—	—	No	—	Graphics extender, \$100
—	—	—	1	0	—	No	No	—	Floppy disk controller, standard cost
1	\$50	No	1	0	—	No	No	—	—

COVER STORY • JIM FORNEY

VIDEO WIZARDRY WITH PC-EYE

This expansion board will transform
your PC into a picture machine and perhaps
even turn you into a video wizard.



Imagine: You videotape a live event with a camera or a pretaped scene with a VCR, and then transfer the images to your PC. The PC digitizes the images and saves them on a floppy or hard disk. Want to alter the picture? Using software, you can retouch the images pixel by pixel. Need titles, credits, subtitles? You can superimpose graphics. Then you can either photograph the finished images from the screen or you can print them out directly.

Imagining this dazzling display of computer imaging technology, you may begin to feel like a video wizard, as I did when I first used the PC-EYE Video Capture System, a new product from Chorus Data, Inc., of Hollis, New Hampshire. Basically an expansion board that turns your PC into a picture machine, PC-EYE can do everything you imagined. The software Chorus Data offers to help you do the retouching and superimpose the graphics is called *IMiGET*.

PC-EYE is a menu-driven hardware and software system that requires only single-keystroke command entries to capture, store, retrieve, and print images that have been digitized. Digitized images have been through the process of being broken up into small, discrete blocks called pixels. Each pixel has a specific location in the image matrix, and each has a digital value that represents black, white, an intermediate shade of gray, or another color. Here's how you use it.

System Menus

The first PC-EYE menu gives you a choice of other menus you may or may not wish to call up each time. The first of these menus configures your system and lets the software know what kind of monitor card, printer, and so forth you'll be using. A file keeps track of the way you've configured the system, and so once you've gone through this menu's questions, you don't need to call up the menu again unless you change the configuration.

On subsequent runs, even if you do



A 4-bit, 640 x 400 image created with a Tecmar board on an RGB monitor.

enter configuration changes, the system retains the original configuration file, unless you go back and reinstall the software. In other words, if I change monitor boards and tell it I've changed, PC-EYE will accept that change as long as I'm in the system. But the next time I call up the program, it will assume I'm back to the old card it shows in the file.

The next menu is a little more complex; it controls the adjustments that optimize the image. Working from it, you use the cursor arrows to adjust the black and the white ends of the image scale to achieve the best visual effect. In my opinion, these adjustments are the most critical you have to make when working with the PC-EYE. You soon get the hang of it with a little practice. Other options from this menu concern other image parameters.

The third menu actually enables you to capture images, store them on the disk, retrieve them from the disk, and send them to the printer. And if you are saving to disk, the monitor displays each image you capture; you can see the image immediately to judge whether or not you really want to save it.

One nice thing about this system is that if you don't like an image you've just saved for posterity, you can keep trying until you get it right. As long as you don't change the filename, each new image will simply write over the old one. And when you get something you want to keep, all you have to do is change filenames and start working on the next image you want to capture.

Using Several Disks

In fact, being basically lazy, I found an even easier way to do this whole routine. If you start with several blank, formatted disks, you don't even have to change filenames—at least not that often. Using your first disk, pick a name and save an image you think is worth keeping. Switch to another disk, same filename, and strike again. This way you have to change the filename only when you run out of disks.

The advantage is that when you want to sort through all the images you've stored for a particular project, you can play the same game in reverse. You can type in one filename and then quickly run through all



The same image as the previous one, with thresholds shifted by a change of exposure.

the disks that used that name, using only a single keystroke to call up whatever image they contain in that name. This method saves you effort spent retyping and time lost switching back and forth between images. You don't even have to re-enter the menu, as long as you don't run out of images with the same name. Just switch disks and hit P for process. A new frame replaces the old one.

Images don't just pop up on the screen with PC-EYE though. The time they take to appear depends on the resolution and the number of image bits. An image produced with an IBM color/graphics card has a file of more than 16K bytes. One of these images fills the screen in less than a second. A full 640 × 400 × 4 Tecmar image from a file of over 131K bytes, however, takes several seconds to write to the screen, starting at the top left corner and writing strips of image, left to right, top to bottom, until the frame is fully displayed.

IMiGET

One of PC-EYE's most interesting features, used with the *IMiGET* software, is

that you can retouch or enhance images you have captured. Although it is intended largely to be used for mixing graphics with video images, *IMiGET* is an icon-oriented program; it allows you to access pixels individually and change them from black to white, or anything in between.

What you do is identify the image area you want to work in and put a box around it, preferably working with a mouse. At the touch of a button, the mouse transports the indicated area up to the upper left-hand corner of the screen and enlarges it several times. You pick up a tone from among the icon selections along the bottom of the screen and go to work. You put the cross-shaped cursor over a pixel and push a button. Instantly the pixel becomes whatever tone you choose.

You can make as many trips back to the icon selection area for different tones as you want; if you make a mistake, you can change it as often as you like until you either get it right or wind up with something you can live with. If you really botch it, you can bring the original image back up from the disk and try again. But be warned, in that case you lose whatever

other masterful work you might have accomplished.

The only real limits are your creativity and patience. You can correct some of nature's worst errors. You can change the tonal separation between adjacent areas, or create separation when none exists. If the background is too busy, you can paint it plain if you like.

Of course, it helps if you're a better free-hand artist than I am. If you're not, you can just keep trying until you've got what you want. Then if you wish, you can save the enhanced image back to a disk, print it on your printer, photograph it from the display screen, or do whatever interests you.

Monitors

For most purposes, the best monitor to use with the PC-EYE is, in my opinion, definitely the composite type—the ones that connect to your PC via RCA phono jacks and coaxial cables. An RGB monitor, on the other hand, won't give you a black and white video image. RGBs don't really like to do grays. Instead they give you colors—wild colors, whether you want them or not. You get seemingly arbitrarily assigned, garishly contrasting colors, even for what should be subtle gradations of gray. The results are spectacular, to say the least, but a little hard to live with for most serious work.

A composite monitor works well in black and white and lots of shades of gray in between. If you have a second composite monitor, you can put it to very good use by plugging it into the bottom jack on the PC-EYE rear bracket. It will continuously display whatever your video camera sees or your VCR sends out. In effect, it becomes a viewfinder for your system while your primary display shows either the last image captured or one of the menus.

The image that comes out of the PC-EYE board rather than the normal monitor card is quite interesting in itself. The people at Chorus told me that it is actually another digitized image. Only this one is a



A 2-bit image created on a composite monitor with a Tecmar board emulating IBM's.

full 6-bit, 128-shade digitization, even though the board I was working with supports only 4-bit images for saving to disk, retrieving, printing, etc. The PC-EYE board image gave me a taste of what those extra 2 bits can do in a tight 640×400 matrix, although I couldn't do any real work with it. The results are positively photographic in quality.

Chorus is also marketing a 6-bit version of the PC-EYE; its people admitted that the differences in the hardware between the two boards are fairly insignificant. Of course, the cost of the additional 2 bits, more than a matter of dollars, is a 50 percent increase in the number of bytes it takes to store an image. (More about this problem later.)

Peculiarities

Working with PC-EYE presents some other peculiarities. At the time I worked with it, the board and the software, plus the preliminary documentation, supported the system's use with any of four of the popular monitor cards. Note: I said supported, not that it was equally compatible or compatible in the same way(s). PC-

EYE seems to look much different even to the boards it supports.

The 4-bit version of the PC-EYE used in conjunction with a Tecmar graphics master will give a full 4-bit image (16 shades including black and white). Image capture times are fairly short. For a full $640 \times 400 \times 4$ image, capture time is about $\frac{1}{3}$ second per image.

With the IBM color card you're reduced to having to choose a $320 \times 200 \times 4$ or a $640 \times 200 \times 2$ image, trading most of your gray tones for increased resolution in the latter mode. A monochrome Hercules board will give only 1-bit images, in black and white with nothing in between. But there's a paradox here; a 1-bit Hercules image uses nearly twice as much disk space as a 2- or 4-bit IBM acquisition, because the Hercules graphics card has a much higher resolution (bits times total pixels in the matrix).

Having played with 1-, 2-, and 4-bit images using various boards, resolutions, and modes, I think it would be a shame to shackle PC-EYE's creative capabilities by using it with anything less than the Tecmar board, certainly now at any rate. The pos-

sible applications for single-bit images in stark black and white seem pretty limited. With a little cheating you can make PC-EYE software think it's got an IBM card when in fact it's got a Tecmar, and if you really want them, you can make it produce 2-bit images.

In fact, you can use a Tecmar board and tell the system up front that's what you're using. Or you can lie, telling the system that it's an IBM color card. You can capture an image either way, although when the system thinks the card's an IBM, you only get a 2-bit image. But if you lie about using an IBM card when you recorded the image, you must also call the Tecmar an IBM board to bring the image back from the disk. Otherwise you get a completely scrambled screen. A genuine IBM color card, however, won't know any better; it will display an image captured by the Tecmar posing as an IBM as proudly as if the image were its very own. But you can't get away with telling the system that the Tecmar you're using is a Hercules; it just won't buy it.

The peculiarities of working with this system continue. If you display an image on your monitor using a Tecmar board, decide that you like it, and save it to a disk, you cannot bring it back up to the monitor via a Hercules board at a later time. It just won't work. If you faked an IBM/PC-EYE format with a Tecmar, you can bring it back either by lying to your Tecmar again or by using a genuine IBM color/graphics card or a very close clone.

Using Other Monitor Cards

Obviously, a number of monitor cards are available, more than those on the rather exclusive list PC-EYE software currently supports. Some are very good. I couldn't resist the temptation to see what would happen if I tried running PC-EYE through some of the cards I had handy that weren't supported by PC-EYE. Clearly, at least some of them, if they aren't compatible already, need only minor software patches to make them compatible.

The Hercules color card doesn't need a

PAINTING BY NUMBER

Computers are the most efficient way to transmit images, whether from outer space via satellite or Lucasfilm, or from the inner space of your mind via your PC. Here's how the computer "paints" those images, pixel by pixel.

It's getting harder to tell where computers leave off and television and other traditional imaging systems begin. Without computerized imaging techniques, you wouldn't recognize many of those fantastic NASA satellite photographs. And without computer-generated animations, many of the special effects you see in movies like those of the *Star Wars* series just wouldn't be possible. With a digital image processing board installed in my PC, I even feel a little like George Lucas.

Pixels

Digital imaging, reduced to simple terms, involves breaking up an image into thousands of discrete little squares or rectangles called "pixels." Each pixel has a specific location so that you can put it back where it belongs in the mosaic, or matrix, as it's called. Each pixel also has a numerical value that describes it in terms of shades of gray or color, hue, and saturation.

This process is very different from that which produces ordinary television. In TV, images are broken up into horizontal lines, and to that extent each line is a little like a string of pixels. But in TV, those horizontal lines are not broken up into discrete units. Television just shoots a little spot along the lines at a fixed speed. As the dot zips along, a completely separate part of the TV circuitry sends information that continuously changes the intensity of the spot. The increments at which this change takes place are not fixed, and for this reason you cannot assign numeric labels to them.

With a little luck, the image turns out to look reasonably decent. The little spot arrives at about the right place on the line, and the intensity circuit does its little dance. But if things go awry, you get an image that is torn or twisted or full of garbage. Because you have no set of fixed references to work from, there's no real way to sort it out.

With digital imaging, each pixel has a numerical value that describes it in terms of color and saturation.

How does breaking up images into pixels, stripping them of their individual identities, and assigning them numbers help in this situation? Imagine a picture of the lunar landscape or the surface of Mars coming in from a satellite in outer space as an example. It has probably already been digitized because that's the most efficient way to transmit data. The transmission picked up a lot of garbage as it came through millions of miles of space. At the receiving end, you take everything that comes in, garbage and all, and feed it into a computer.

In the Computer

First, you put all the pixels in their proper places in the matrix. You can do this step very accurately. If a few pixels lose their identities along the way, however, it's okay. Now you have some tiny holes here and there in the matrix, but you can be sure that they are caused by errors in transmission and recovery. So don't just crowd the pixels together to fill the gaps; you'll deal with them later.

At this point you have an image of something, but obviously with a lot of garbage. How do you separate the good stuff from the garbage? Here the computer really goes to work. Because an overwhelming percentage of the pixels have about the same numeric value, the computer knows that the surface is basically some rather monotonous color, say a rather dull reddish brown.

As the pixels go by, the computer suddenly finds a blue one. The computer says, "No, whatever you are, you're not blue because blue doesn't fit the norm. So I'm going to paint you dull reddish brown, because that's probably what you are. Even if you aren't, it doesn't matter that much because nobody will ever notice." No matter what odd color that lonely little pixel said it was, it gets colored the same as its environment. The same thing goes for a hole that's lost its pixel; the computer blends it in with the whole picture.

The odds of two or more adjacent pixels picking up the identical defect during transmission are pretty slim; so if the computer suddenly finds a little tightly

(continued)

(Painting by Number continued)

grouped bunch of bright blue pixels, it would have to say, "Okay, be blue if you want, I know the rest of you are still dull reddish brown." At that point a human being may come along and say, "I think you got carried away a little on that blue. Tone it down and try again."

This description is a gross oversimplification of what has evolved into a highly sophisticated technology. However, some of the earliest computer-enhanced images you may have seen probably used techniques nearly as simple.

Image Resolution

When dealing with any imaging system, you have to come to grips with a few basics. One of the most important is image resolution, the actual amount of detail possible to reproduce, or, in other words, the smallest detail that can be distinguished from its surroundings. And in this case, more isn't always better.

Using the Tecmar Graphics Master with the PC-EYE image-digitizing system, you can attain a resolution of 640 pixels horizontally by 400 vertically. That degree of resolution means an object or detail must be nearly $\frac{1}{640}$ of the view wide by $\frac{1}{400}$ high to be seen as a contrasting dot. And it assumes that the object falls neatly within the fixed boundaries of a single pixel, which is unlikely. More typically, an item or detail that small will overlap several surrounding pixels and influence the way they are represented without having a specific identity. If, for instance, half of one pixel were black and the other half white, the average value would be medium gray (about 18 percent); that's how it would be recorded and ultimately reproduced.

A larger detail that occupies one or more pixels, then, will dictate how those pixels show up, while also influencing the reproduction of any adjacent ones it may partly overlap. High resolution

becomes important here. The higher the resolution, the greater the chance that a small detail will have its very own pixels, rather than just muddying someone else's.

However, you cannot deal with the matter of resolution without also taking

No matter what color that lonely little pixel was, it will become the same color as its environment.

into account the number of gray scale steps the system can support. The PC-EYE 1000 I tested is a 4-bit digitizer, so it supports 16 shades between black and white ($2 \times 2 \times 2 \times 2$). Chorus Data also makes a 6-bit system, the model 1100; it will support up to 64 shades of gray. But there's a paradox; more is not necessarily better. It depends on the application.

Contrast

The problem is contrast. The difference between each shade when there are 64 to choose from is more subtle than when there are only 16 or less. As long as you are dealing with a computer, you could have a thousand shades, even ten thousand, and the computer would clearly see the difference between a value of 9,997 and one of 9,998.

But you could look at a raft of 9,997s adrift in a sea of 9,998s for a lifetime and never see them. In fact, you'd be lucky to spot adjacent pixels only $\frac{1}{64}$ apart in value. Reduce the shades to 16, and you

should be able to see the difference. So the paradox is that less detail often produces greater contrast and the visual impression of greater sharpness or detail.

Economics can also be a factor. If you were dealing with, say, the first photos of the planet Pluto, you might be willing to sacrifice a lot of tonal gradation for more pictures. You can transmit and receive twice as many 2-bit (four tone) images in the same bandwidth or period of time as 4-bit images. And since no one knows what Pluto really looks like, any kind of image will tell us something we didn't know before. So more images with less detail might be more valuable than more detail in fewer pictures.

But if you're dealing with images of familiar objects, you expect them to look reasonably familiar. Shades of gray may suddenly become important. Take an image of a human face, for instance. Reduce it to a 1-bit image where there is only black and white and no gray at all, and the effect is surrealistic. Double the number of bits so you have two gray tones in the middle, and the effect is still more like a stylized poster than a photograph. You can begin to accept it, though, especially under the right lighting conditions and if you can juggle the few tones effectively. Double the image's tones again, to 16 (4 bits), and the face starts to look almost photographic in quality—if you've juggled the cutoff points for adjacent values well.

In digital electronic imaging, then, you are limited only by the human eye and the visual process. If you're dealing with a device designed to produce an image pleasing to the human eye and not a bunch of numbers only a computer could love, you have to take contrast and resolution into account. Given a choice between higher resolution and a greater range of gray tones and assuming human visual perception is involved, you should opt for a few less tones so that you have

better contrast to go with the higher resolution.

In fact, with sufficient resolution you need only black and white to reproduce any shade of gray you see. Black and white camera film is exactly that: black and white. You think you see only grays where tiny bits of black and white too small to distinguish blur together in your eye, giving an impression of some tone in between—just like the pixel that was half-black and half-white and was interpreted on average as gray.

Black and white pictures reproduced in magazines or newspapers are a classic example of the same phenomenon. In film the bits of black are random rather than discrete. Printers don't use gray ink to reproduce gray. If they need a light gray, they print a very small black dot in

In digital imaging you are limited only by the human eye and the visual process.

a fixed field that is otherwise white, increasing the portion of the field they color black to produce darker grays. Printers measure dots per inch, but each field occupied by a single dot is really just a pixel by another name. The difference is that if a printer's dots somehow got lost and you had a little pile of them in your hand, all the computers in the world couldn't put them back in order again. With digital imaging and pixels, however, the computer could restore the pixels to their proper place and recreate the image.—J.F.

thing. Just tell the PC-EYE software you've got genuine IBM in there, and it goes off to do its thing. You can save the images to disk or bring them back alive. The same thing goes for the new Paradise modular graphics card used as a color/graphics adapter. If you tell the same lie to the system, you get the same in-and-out results.

The Paradise multidisplay card with a color monitor would display a 2-bit image comparable to what a genuine IBM card would do—if you told the software it had an IBM card. And it would save the image to disk too, but the program would crash in the process. You could also bring the image back from the disk to the screen, but that would crash the program—and at the very same line. When I tried this subterfuge in the mono mode, however, the software would not buy the Paradise multidisplay card as a Hercules, and the program crashed.

Color Images

So far, I have discussed the PC-EYE system as if it were strictly monochromatic. But that's not true. It can record color images directly from almost any video camera that has separate color outputs. The back of the PC-EYE board has four input channel jacks for such applications.

An alternate method produces color video images with a monochrome video camera. However, this process is rather tedious. It involves acquiring three separate images of the same cooperative, dead, or otherwise immobile subject, each through a different color separation filter (narrow spectrum red, green, and blue) and then simultaneously displaying the three images, properly channeled, on an RGB monitor.

When dealing with color, however, you start running into problems of mass storage, especially if you want to work with a tight matrix and at least a 4-bit range of tones or hues. A monochromatic Tecmar $640 \times 400 \times 4$ image requires 131,072 bytes to store. Three times that

(red plus green plus blue) is more than 394K, and 394 won't go into 360. An IBM image capture requires only 16,384 bytes for a monochrome image, so even in color we could squeeze a half-dozen images on a single disk with a little to spare, but at the price of a significant loss of resolution and/or tonal gradation.

Chorus has now come up with another way of significantly cutting the storage space requirements for full RGB images namely, a second board the company has just developed. Thus, color images are processed as 3-bit color images rather than the full 4 bits for the reds and greens, with blues reduced to only 2 bits for a total of 8 bits. By going through this additional board, which will fit a short slot, the storage requirements for a 240×400 RGB image are cut by about a third since a total of 12 bits would be required to store three full 4-bit images.

This scheme produces no less than 256 colors, and the resulting images are quite acceptable. And by favoring the reds and greens at the expense of the blues, the loss in important skin tone areas where you would notice it most is not as significant as might be imagined.

Still, we're talking about large blocks of storage memory. Of course, you can store your image data on a hard disk if you have one. But even then, at over a third of a megabyte per three-color image, a hard disk would fill rather quickly.

Another solution is to compress the data, using the compression/expansion software supplied with the PC-EYE. You can squeeze a 4-bit image down to 2 or even 1 bits for storage, then reprocess it back up to 4 bits when you want to use it. This compression/expansion route is far from ideal; it takes about 6 minutes to stomp the air out of a $640 \times 400 \times 4$ Tecmar image and another 6 minutes to pump those little pixels back up again. The 2-bit compression mode squeezes 131,072 bytes down to 64,256, and you can go all the way to 1-bit compression and back if you wish, although I really wouldn't recommend it. Expansion brings them back



A 4-bit, 640 × 400 image created with a Tecmar board on a composite monitor.



Here, white-end thresholds were shifted for greater tone separation in skin areas.

up to 128,256 bytes. You can see that something gets lost along the way.

Actually, the loss is greater than the numbers seem to indicate, for they don't seem to be using an especially efficient compression algorithm. I found that the reinflated images were severely degraded, with a great deal of herringbone even just

to the 2-bit compression and back. However, for images you don't want to throw away yet, this solution works well enough. Then if you needed to use them, you could use the *IMiGET* graphics package to paint out the most objectionable herringbone areas. But you'd need more patience than I've got.

Printing Problem Solved

Obviously then, even with PC-EYE, your personal PC is not yet ready to replace the nice, neat trays of slides from your last family reunion. I found PC-EYE frustrating to deal with when I tried to print out the timeless masterpieces I had saved to disk so that I could share them with the world. The software I had was supposed to

Your PC is not yet ready to replace the neat trays of slides from your last family reunion.

be compatible with IBM/Epson, which is certainly reasonable when you're aiming at the PC market, except that the printer I was using was not IBM/Epson.

However, a call to the technical support staff at Okidata assured me that if I installed their Plug 'n Play set of ROM chips, I would gain instant IBM compatibility for my Microline 92. For some reason Okidata builds their printers with a different pin-firing sequence than the IBM/Epson protocol. You can get by with it very nicely for text, but graphics are another matter.

So I ordered the chips and converted my printer to full compatibility with IBM. The operation was painless enough. The problem was, it didn't solve my problem. I tested my altered printer, even using the test program used in *PC's* printer issue to verify that my printer was now compatible with IBM in the graphics mode. It checked out, but it wouldn't work with the PC-EYE software.

In fact, even if I ran GRAPHICS from my DOS 2.10 disk and proved it was in

THE EARLY DAYS OF DIGITAL IMAGING

Some California researchers at Scripps Institute were performing their wizardry with digital imaging techniques 20 years ago.

There's nothing really new about the technology required to break up an image into discrete units or pixels and assign each a numerical value corresponding to some shade of gray, or even hue and color given sufficient bandwidth. I was first exposed to it nearly 20 years ago at Scripps Institute's Visibility Laboratories, near San Diego. The people there had been using digital imaging techniques for some time even then.

Their work was largely experimental, but in Pasadena at the Jet Propulsion Laboratories, scientists were already applying digital techniques to images transmitted back to earth by both manned and unmanned space probes. By using these techniques, even at that early stage they were able to enhance image quality and to a great extent eliminate snow and other garbage picked up during transmission through space.

Much of the early work in digital imaging was quite crude by today's standards. Computers and computer time were so precious then that for the most part the matrix that the people I visited at Scripps were experimenting with was coarser than the one the PC-EYE board is capable of producing with an ordinary desktop PC. And though they were working in a room full of computers, one of their most important tools was an ordinary toilet plunger. They needed it to lift large floor tiles so they could get at the miles of thick cabling under the false floor.

Yet they were doing some fantastic things even then. Together with astronomers at Mount Palomar, they had used digital imaging to unravel the mystery of what appeared to be a binary star (two stars revolving around each other, too close to be seen as separate with the ordinary optical telescope). They first photo-

By today's standards, the early work in digital imaging was quite crude.

graphed the binary star. These photos looked out of focus and blurred until the researchers reprocessed them digitally into acceptably sharp images that showed the two stars clearly.

Computer Pyrotechnics

In one project, they programmed the computer to design camera lenses for special applications. But that was only the beginning. Suppose they needed a lens to photograph ships 20 miles off shore. Given some basic parameters, the computer would design a lens. But then no lens is ever perfect; most of the imper-

fections are predictable even during design. Plus, pictures are rarely made under perfect conditions. So after the computer had come up with a lens design, the scientists would feed it a digitized image, say of a ship. (They stored their digitized images on tall stacks of punch cards at that stage, rather than on disk.) The computer would then reprocess the image and give it back to them on a Polaroid print, as if the lens the computer had designed had taken the print.

The computer would account for all the predictable design aberrations. The engineers could also introduce typical atmospheric problems, such as bright sun or clouds, haze or smog, or the shimmering effect of a desert on a hot day. If the picture didn't work for that particular application, they could avoid the expense of actually grinding the lens and finding out the hard way.

And it didn't stop there. After the computer gave the researchers a couple of minutes to examine the picture, a little bell would ring impatiently; the computer asked if they wanted to try again but with some changes. If they did, they became involved with such problems as Fourier transfer curves and started over somewhere in the middle of the process.

Their work was very advanced for the time, but I guess you'd have to say we've come a long way. I don't even need a toilet plunger to keep my PC up and running.—J.F.

the graphics mode by calling up and dumping a test graphic to the screen, it wouldn't work with the PC-EYE software. Something in the software was knocking me out of the graphics mode.

At first the people at Chorus Data were puzzled by my problem. But then one morning Bruce Monk, the marketing vice-president of Chorus, called and told me that they had discovered my problem.

IBM/Epson and the "straight" IBM are different. My modified Okidata was emulating the IBM protocol. It was looking for a new graphics Escape sequence at the beginning of each line that just wasn't

there. Once we had identified the problem, Chorus patched the software to circumvent it.

When I did get the images to print, I discovered something rather interesting. When printing on a graphics printer, the PC-EYE system turns the image 90

The circuitry of the PC-EYE board appears to be fairly complex. Its installation, on the other hand, is a reasonably straightforward task.

degrees on the paper. The first line it prints is the extreme left side of your image. From there it proceeds down toward the right side. The process is slow, taking several minutes to print out a whole image. The finished image is approximately 8 by 10 inches.

Installation

The circuitry of the PC-EYE board appears to be fairly complex; a daughter-board piggybacked on the main board accommodates the overflow. The installation of the circuit board, on the other hand, is a reasonably straightforward task. The preliminary documentation that I had to work with was more than adequate to show me how to do the job. Basically, you just take the cover off your PC and plug the board into an empty expansion slot.

However, if you're already using a Tecmar board, you may have to rejump it to a different configuration so that it will

work with PC-EYE. That was the situation I found myself in. The reconfigured board was then not compatible with my IBM green screen; so I had to take the board out and rejump every time I changed functions—not my favorite pastime. If you need an excuse to add a second monitor card to your system (you'll need the slot space to spare), my experience should sway you.

Documentation

I felt the documentation (even in the preliminary form I received) was generally adequate. A basic manual helps you get the board and the software installed and running.

For the more adventurous and technically inclined, PC-EYE has a technical reference manual that details the essentials of what the system can do. (This manual really gave me a scare at first. When I opened up what I thought were the basic instructions, I suddenly found myself reading about Pascal and C compilers, with no information about how to put the board in my PC and get it running. Then I found the basic manual, realized my mistake, and relaxed.)

It Works

It's difficult to evaluate a product like PC-EYE, which, at least at the moment, is unique in the field. You really can't hold it up against a brand X and say, even to yourself, that it does this thing better but isn't quite as good in doing that one. And added to this difficulty is the fact that software support for the system is still in its infancy.

For now, I can report that the hardware and the accompanying software worked. The system did everything I asked it to do, and even a few things they don't have in the book yet, such as working with other monitor cards.

Potential for Use

PC-EYE is at present too new to the marketplace for me to predict how extensive its applications will be in the future,

but already some indicators show that it may have more uses than first meet the eye. Obviously, PC-EYE should appeal to firms that specialize in preparing professional slide shows. And it should be a natural for many graphic arts firms. Both of these two industry groups have shown an active interest in the product. The scientific and medical communities have also expressed interest. In industry, some practical applications are emerging, such as use in inspection and quality control, where optics and optical systems have for a long time played an important role. Telecommunications firms have also been paying attention, but I don't know just what the potential applications there might be. In addition, I'm sure someone will come

It's difficult to evaluate a product like PC-EYE. It's unique in its field, and its software support is still in its infancy.

up with some very interesting, imaginative uses for PC-EYE.

In fact, I would advise Chorus Data to run a contest, complete with an appropriate prize, to see what kinds of applications people can propose—from the far out to the extremely practical. Such a competition would draw attention to the product, which it deserves, encourage prospective buyers, and bring some fun and excitement to a technical endeavor. And, after all, what endeavor can't use some added fun? In fact, I had so much fun using PC-EYE, I had to keep reminding myself that I was working. Perhaps that's the best tribute I can give the system. ■

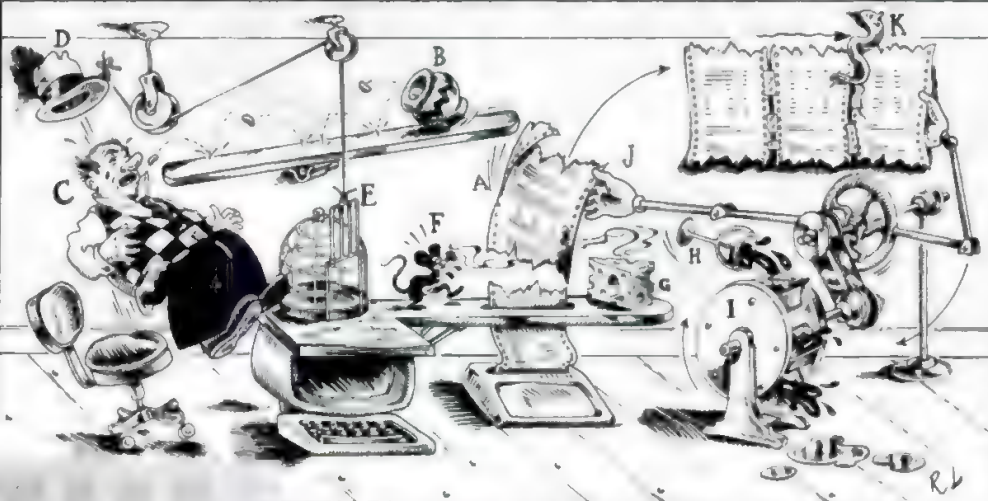
SIMPLIFIED SPREADSHEET ASSEMBLY

BRING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBODULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



MADE SIMPLE.

Now you can save time, aggravation, adhesive tape, and Gorgonzola cheese by following one simple direction—Sideways. It's the unique software program that lets you output all the spreadsheet columns you need, all on one continuous page, all with one print command—and all for only \$60!

With Sideways on your side, no spreadsheet you invent with Lotus 1-2-3™, VisiCalc®, Multiplan™, or SuperCalc™ is too wide! And it's just as powerful an ally when you're creating far-into-the-future schedules and pert charts with your word processor. In fact, for any wide text file, for dozens of uses, the way to go is Sideways.

The experts agree. *PC Magazine*, for example, writes: "If you've got the need, Sideways has the solution." And *PC World* calls Sideways "nifty . . . an easy to use program that does what it claims."

You can go Sideways today with an IBM® PC and an IBM® Epson, Okidata, Prism™, or Pro-writer™ printer. Ask for Sideways at your local ComputerLand® or other leading computer stores. Or mail a \$60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. (617) 497-6339. MC/Visa accepted. Send no Mexican jumping beans, please.

SIDEWAYS™

FOR EASY-READING HARD COPY

CIRCLE 306 ON READER SERVICE CARD



COMPLETE IBM™ PC SYSTEMS

IBM PC STARTER SYSTEM

IBM PC w/64K (256K capacity)

\$1,620.50* (35.00)

- 1 Double Sided Double Density 320/360 Disk Drive
- Hercules Color Card w/Parallel Port
- Zenith ZVM-123 Display Monitor

CALL FOR
LATEST IBM
PRICING

IBM PC BASE SYSTEM

IBM PC w/256K

\$1,575.73* (34.16)

- Floppy Drive Controller
- 2 Double Sided Double Density 320/360K Disk Drives

IBM PC PROFESSIONAL HARD DISK SYSTEM (XT)

IBM PC w/256K

\$2,000.73* (43.20)

- 1 Half Height Disk Subsystem
- 1 Half Height 10MB Drive Allows Room
for Addition of Tape Backup in PC
- Automatic Hard Disk Boot Feature

CUSTOM
CONFIGURATIONS
WELCOME

The 10Mb hard disk eliminates cumbersome floppy disk changes, simplifies

man you'd expect to pay for a standard PC.

*PC Network Members pay just 8% above this wholesale price plus shipping. These prices have been prepared in January, 1985, and may have been changed with new product announcements. Call for latest prices.

LATEST ISSUE FEATURES!

▶ 64K MEMORY EXPANSION KITS \$ 26.91*

Set of 9 chips! Guaranteed for Life.

▶ LOTUS 1-2-3 269.00*

New Best Price!

▶ COGITO 10MB INTERNAL

HARD DISK 625.00*

Low Power Automatic Boot

▶ PANASONIC SHUGART per pair 225.00*

1/2 Height DSDO Disk Drives with Mounting Kit

▶ STAR MICRONICS GEMINI 10X ... 225.00*

120 CPS Epson IBM Graphics Compatible w/Tractor

TANDON TM100-2 DRIVES 140.00*

ORCHID BLOSSOM 64K installed 205.00*

New Price! Full Six-Pack Features
with networking capability!

AMDEK MONITORS

V300G Composite Green 110.00*

V300A Composite Amber 120.00*

V310A IBM Amber 130.00*

HERCULES COLOR CARD

w/Printer Port 148.00*

HAYES 1200B with new Smartcom II

VT100 Emulator 366.90*

NEC SPINWRITER 2050 625.00*

20 CPS-Letter Quality Printer

BRAND NAME DISKETTES 16.00*

DS/DD Box of 10 Guaranteed for Life - Not Generic

*NETWORK members pay just 8% above these wholesale prices plus shipping.

PC NETWORK

... WITH THESE 15 UNIQUE BENEFITS

1 COST + 8% PRICING—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

2 OUR 500 PAGE WHOLESALE CATALOG—Members receive our 500 page wholesale catalog containing over 20,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. THE NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY. NOW UPDATED QUARTERLY!

3 IN-STOCK INSURED FAST HOME DELIVERY—The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVERNIGHT SERVICE IS AVAILABLE ON REQUEST.

4 10 DAY RETURN POLICY—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

5 MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

6 EXPERIENCED CONSULTANTS—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 man years of personal computer product experience. We back our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.

7 FREE TECHNICAL SUPPORT—The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!

8 OPTIONAL BUSINESS RENTAL LIBRARY—All members can join our BUSINESS RENTAL LIBRARY featuring over 1000 available titles for just \$25 PER YEAR above the base membership fee. This entitles you to rent business software AT JUST 20% of the DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 28 DAYS for just \$30 above the V.I.P. base fee. This also includes the game library privileges for a \$5 combination savings.

9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY—The Game Rental library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

10 SPECIAL SAVINGS BULLETINS—THE PRINTOUT—Issued Quarterly at no charge to Network members only! The Printout contains all the New Product listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories, and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via THE PRINTOUT.

11 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

12 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

13 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users (see opposite page left). The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

15 PRICE PROTECTION—The PC Industry is crazy!! Prices change not yearly or monthly or even weekly but often day by day! These changes are sometimes up but are mostly down!! THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!

CALL TOLL FREE 1-800-621-S-A-V-E (orders and inquiries only)

In Illinois call (312) 280-0002 validation code A145

CIRCLE 535 ON READER SERVICE CARD

COVER STORY • JIM FORNEY

THE C-77 VIDEO



MIX-UP



Rapitech's C-77 Video Mixer merges video images and computer-generated text and graphics onto one screen. But does its performance merit its price?

A computer is a computer and video is video, and now the twain have met on the PC. Rapitech Systems, Inc., has developed a compact box that mixes video images and computer-generated graphics and displays them on an ordinary TV screen. The C-77 Video Mixer can simultaneously accept images from a variety of video cameras or VCRs as well as data, graphics, animation, or anything else you can generate on a PC. The mixed output can then be viewed on a composite-type video monitor or recorded on a VCR for later use.

Although the C-77 is limited in terms of what it can do with what you feed it, it doesn't take much expertise, either with video cameras or computers, to get started using it. With very little practice you should be able to put together effective presentations for a variety of purposes.

Some applications that come to mind are trade-show or point-of-sale displays where time or budget limitations effectively rule out more elaborate presentations. I can think of a number of possible applica-

C-77 VIDEO MIXER

tions using grids as overlays, ranging from archeology to zoology. Or you could use ordinary computer data output, either alongside a video image or superimposed on it, provided it were formatted for not more than about 40 characters per full screen-width line. (Smaller characters would be almost impossible to read on a composite monitor.) The ultimate limitation is your own imagination.

The CHARGEN Program

Perhaps one of the likeliest uses of the C-77 would be to superimpose text over a video image. The C-77 mixer comes with software for generating such text overlays, but the people at Rapitech told me not to expect much from it. The software consists of a single program on a disk, and all the manual says is, "Inside the box you will find a diskette with the program CHARGEN. This will allow you to generate characters alongside your video picture. If your computer is not an Apple, Atari, or IBM, a listing is enclosed rather than a diskette."

You don't need any instructions to use CHARGEN, which is a good thing since none are provided. The program asks you a series of yes/no or multiple choice questions to establish parameters and then leads you by the hand as you input copy. CHARGEN has no amenities, such as wordwrap, and it will not permit you to backspace or delete once you've reached the maximum character count allowed for a line. So before you start punching keys,



C-77 Video Mixer

Rapitech Systems, Inc.
Avas Corporation
P.O. Box 1070
Hackensack, NJ 07602
(800) 631-0867

List Price: \$499.95; with RF modulator for use with a TV receiver, \$599.95
Requires: Color/graphics card or other means of generating video output.

CIRCLE 741 ON READER SERVICE CARD

you really have to sit down and figure out exactly what to put on each line, which lines you want to center, and so on.

After typing in your text, the program asks you for a filename and then uses it to create two separate files. One is the text with the name you gave it; the other is a data file with a "c" prefix before the same name. I was then able to correct some typing errors by calling up the text output file and editing it with my word processor. So all is not lost if you do mess up.

CHARGEN has two text modes: single-size and double-size. Essentially all

The C-77 box itself is strictly a device for mixing, and nothing more.

CHARGEN does is bring up a 34-character line of single-size characters, which gives acceptable clarity on a composite monitor. For most of the applications that come to mind, this limitation won't be a drawback.

I did find what Rapitech calls double-size text extremely limiting, except perhaps for applications in which you've only got one screen of text to overlay continuously over some changing video background. The problem here is that each double-size character is laboriously generated each time through the program, a process that takes about 2 seconds per character, or a little over 30 seconds per 17-character line—the maximum double-size line length.

In the mode that replaces all the text on the screen after some programmed period, this could mean waiting for over 5 minutes for the computer to write ten lines, then dumping it and having to start all over again. For more complex presentations,

this could be combined with single framing for recording on a VCR, but it's a drag for any real-time application.

Single-size characters used in lines of up to 34 characters do not impose the same overhead on the system. The C-77 can write a whole screen of these characters in under 2 seconds at a rate that's interesting to watch.

There are few things in this age of technological miracles that can't be screwed up with a little effort, and CHARGEN's big white letters are no exception. Driving a Sony Trinitron monitor with a Tecmar Graphics Master board, you could do a little creative twiddling with the color and hue knobs, turning single-size white text on a black-and-white background into a visual kaleidoscope of color. With careful adjustment, the multicolor text could be made quite readable.

The same technique, when applied to double-size letters, did not produce the same effect, but it did result in softly colored text, all of some uniform color. Results ranged from sort of chartreuse to almost orange, and at one point I had an interesting blue shadow effect setting off orange text. As an overlay for a monochrome camera image, such gimmicks can make an eye-catching presentation.

The overlays that can be prepared with the CHARGEN package are limited strictly to text, and to just one font of text. By going to one of the more versatile graphics packages such as the various derivations of *Halo*, the graphics that can be created to use in conjunction with either real-time or taped video images are limited mainly by your imagination. I played with a couple of quick screens of graphics that, though lacking in artistic merit, gave me a better feel for the possibilities—and the limitations—of the system.

Muddy Mixing

The C-77 box itself is strictly a device for mixing, and nothing more. It's like putting cream in your coffee—when you pour it in, you have coffee with streaks of cream, but once you stir it everything

blends together. The same is true with the C-77 when you start mixing in graphics. With straight white text, you can saturate the screen and overpower any trace of video that tries to peek through. For more complex graphics, though, shadings or hatch patterns become muddled as the video shows through. For anything besides simple text, you need to lay out the graphics and a video "window" so that they don't overlap and go mushy.

I wanted to "paint" video images into boxes, circles, or assorted odd shapes, but this isn't possible. Instead, you have to lay out your graphics screen and then stick your video window in where it will complement rather than just muddy your graphics. Or you can take the opposite approach and design your graphics around some predetermined video window.

Speaking of windows, I feel that Rapitech's advertising tends to be misleading in a couple of respects. It claims the C-77 unit "features full window control, allowing you to place any size window anywhere you wish on the screen." While it's true that you can move the window on the screen, you can't move the picture that's in the window.

If you start with the whole screen as your window, taking your input either from a camera or a VCR, you get the whole picture on the screen. But changing the size of the window just changes how much and what part of the picture is visible. If the right side of the screen is your window, you will see the right side of the picture you're feeding it, but you lose the left side. If you're working with a camera as your input source, you can simply aim the camera a little to the left to compensate. But if you're working with a broadcast TV signal, either real-time or recorded, your windowing options are pretty limited. As you close your window, you lose part of the image—you can't shrink the size of the picture so all of it will fit.

One of Rapitech's ads claims, "thanks to Rapitech's advances in LSI technology and miniaturization. . .the C-77 comes in a mini-box. . .with a mini price tag." I



The C-77 mixer lets you combine computer graphics and a TV image onto one screen.

felt the box didn't live up to the price tag, and I couldn't resist sneaking a look inside. To do this I had to cut a seal warning that opening the box automatically voids the warranty.

Inside, I didn't find anything resembling a large-scale integration (LSI) chip—just five ordinary-looking chips (with their identifying numbers sanded off)—populating a not-too-busy-looking board with a small handful of other ordinary-looking components.

I called Henry Weiss, the vice-president of the company, and he admitted that the C-77 uses no LSI technology. The identification is removed from the chips, he explained, as a "second level of protection" against anyone's trying to steal the design (the first level is the seal on the box). Weiss hastened to point out that the circuit board is Rapitech's design, and I can't quarrel with that.

I wasn't very impressed by the quality of the unit, either. For one thing, the very light-duty shielded connecting cable that came with the unit failed early in the tests. I'm sure the much higher-quality replacement I bought at Radio Shack for \$3.95 retail could be bought in manufacturers' quantities for well under a buck, and I expect such quality on a \$500 item.

The C-77 uses one of those relatively cheap outboard power-supply units that you can use with small radios or tape recorders. You know—the kind with a little box that plugs into an outlet and then connects to your device with a very flimsy length of wire. It didn't fail, but you can easily yank out the wire.

The C-77 mixer package is badly overpriced, both in terms of what you get in hardware and what that hardware is capable of producing. Since the numbers were carefully sanded off the chips, I can only speculate—but I'll bet I could buy all of the parts retail at Radio Shack for well under \$100, which would probably put the OEM cost at less than \$30 per copy.

Granted, it's difficult to put a value on development and marketing costs, and certainly those costs have to be recovered through sales if a manufacturer is to survive in the marketplace. But, even allowing for the fact that the market for mixers is probably far more limited than for many other popular add-ons, Rapitech's numbers seem quite high.

While the Rapitech C-77 unit is an interesting camera/computer graphics image mixer, its performance was not up to my expectations. And it certainly isn't a bargain at the price. ■

COVER STORY • DAVID POWELL

GETTING ON THE AIR

Your PC can produce video images that, with modification, can be broadcast over the airwaves. This television magic comes to you with help from a box called a time base corrector.





ON THE AIR

If you have spent much time creating images (especially animated ones) using the IBM PC Color/Graphics Adaptor, you've probably contemplated "dumping" those pictures to videotape. If you have a Betamax or VHS home video recorder, you will have some success recording directly from the color graphics card's composite output jack. But for its own reasons, the IBM PC produces video signals that are not quite standard. These signals will make any broadcast engineer shudder. To send such images over the air, you must first deal with certain technical and legal considerations.

In this article David Powell reveals how to program the Motorola MC6845 CRT controller, at the heart of the PC's color graphics card, to produce images acceptable to the television industry. By following the author's guidelines, you can process screens that have been output to nonbroadcast home or 3/4-inch videocassette formats through a magic box called a time base corrector. You can then re-record them on professional equipment or broadcast them over the airwaves. Here's how Powell says to go about it.

The IBM Color/Graphics Adaptor is based on a Motorola MC6845 CRT Controller IC. This design gives you various capabilities IBM saw no reason to support in the software it supplies. The one you need to concern yourself with in your efforts to produce images that can be broadcast on television is the selection of interlace sync.

Using BASIC, you can access the 17 registers internal to the controller on the color/graphics card in two steps. First, put the desired register number, in this case number 8, OUT to port &H3D4, which is 980 in decimal (quicker to enter in BASIC), to load the address register. Then, the machine will direct whatever byte is sent to the next port, number 981, to register 8. One minor complication is that access to any register in the MC6845 via the BASIC interpreter will require use

of the address register. Therefore, to change a parameter in the controller from BASIC, you must enter both OUT commands on the same line. To select interlaced sync, enter

```
OUT 980,8: OUT 981,1
```

To return to normal, enter

```
OUT 980,8: OUT 981,2
```

You can select the interlace mode in any SCREEN mode. This mode will change the appearance of your screen,

The IBM Color/Graphics Adapter's scan rates are very close to those of standard broadcast television.

whether graphics or text. Less, if any, gap should appear between scan lines, making the vertical components look more solid. Most noticeable, however, will be a definite flickering.

The IBM Color/Graphics Adaptor, like most computers (with the exception of the IBM Monochrome Adaptor), generates horizontal and vertical scan rates that are very close to those of standard broadcast television, in this case within 0.22 percent. Designing the board this way requires no special monitors. When resolution is not a critical factor, you may even use a standard TV receiver with a modulator. Since the vertical rate is close to 60 Hz and the horizontal near 15,750 Hz, the number of scan lines is only about 262 (exactly 262 for IBM). You need at least 20 lines to allow time for the electron beam to return

to the top of the screen to start the next frame. Thus the practical limit to vertical resolution is about 242 lines, of which IBM uses 200.

So how can some video systems claim 400 to 480 lines? This is where the interlace technique enters the picture.

Two Identical Fields

The video standards (RS-170A) used in this country were developed in the 1950s. They carry the initials of the developing committee, the National Television Standards Committee, NTSC. (Despite what some engineers claim, NTSC does not mean Never Twice the Same Color.) These standards were built on the older, monochrome standards, which include interlace and specify 525 scan lines. Alternate vertical fields, occurring at about 60 Hz, have vertical sync pulses shifted one-half line in time. The result is that each visible field of scan lines fits *between* the lines of the other, effectively doubling the number of lines on the screen. Any computer or board producing over 242 lines of vertical resolution on a standard TV or monitor must use interlace. When you select interlace in the way described above, you produce two identical fields per frame, showing a total of 400 lines vertically. But since you don't have the on-board memory for addressing both fields separately, you get 200 line pairs.

Why the flicker then? When all points on the screen are illuminated 60 times per second, persistence of vision smooths the flicker (if you don't think it's flickering all the time, shoot it with a still camera at less than 1/60 second to see how much is lit at any given time). When you select interlace, each point is lit only 30 times per second, and a definite flicker appears.

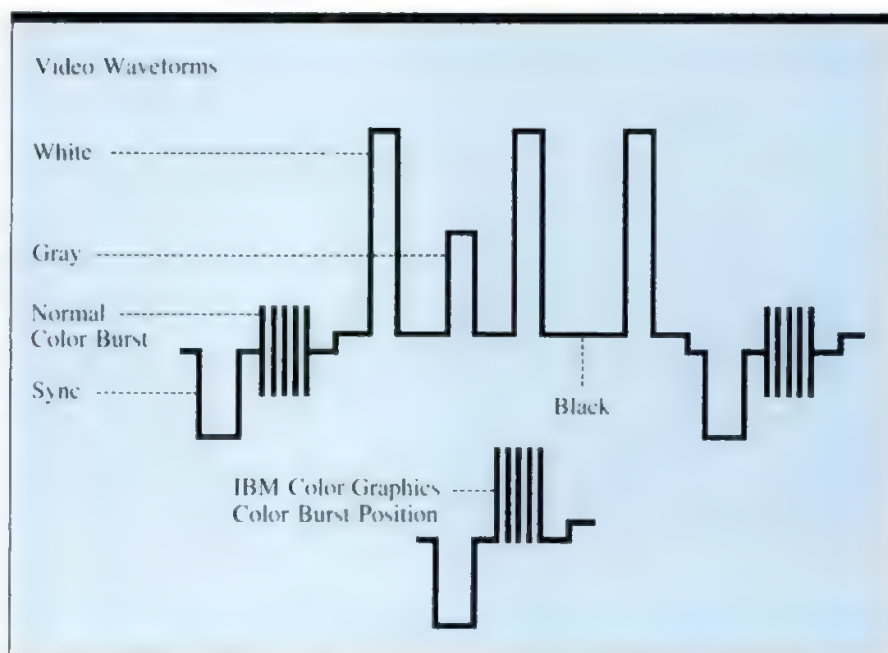
But, you ask, why doesn't my TV flicker? TV cameras used in broadcast cannot resolve any point or line small enough to turn one line on and the next off; operators of electronic graphics generators quickly learn about the problems of picture elements that are too small. The smallest electronic characters superim-

posed on the screen are almost always twice the height of your 40- or 80-column text. In a nutshell, flicker appears only when adjacent scan lines have brightness levels that are radically different from most text and line graphics from computers, especially in narrow lines. Interface would cost about the same as IBM's standard setup, but, considering the problem with flickering, you can see why they chose not to use it.

The luminance component of a video signal conveys information about brightness. In broadcast TV it is mostly in lower frequencies, below 3 MHz, and the resulting picture is displayed on a monochrome TV or monitor. A 3.58-MHz "subcarrier" is mixed onto what is called the back porch of the horizontal blanking (retrace) period to identify and synchronize a color signal. This subcarrier is mixed with the luminance component to generate color areas in a picture, its phase and amplitude corresponding to the hue and the amount of color. Mixed with luminance, this subcarrier is called the chroma signal.

Preparing to Broadcast

Putting your mono graphics or 40-column text on the air is pretty simple. You can generate some beautiful key signals. The main problem with the signal is that the horizontal and the vertical frequencies are not quite within legal specs. Also, there is no simple way to drive them using external reference signals. However, nearly all broadcast stations now follow standards for U-Matic and/or one of the two 1/2-inch broadcast-quality tapes. When such tapes are aired or transferred to another tape format, their signals are processed through a time base corrector (TBC). The TBC removes the jitters and other timing instabilities inherent when video is recorded mechanically. Since in these formats the chroma and the luminance are processed separately, you can correct the slight frequency error in luminance without any adverse effect on the chroma. The TBC also adds sync pulses of proper widths to suit the ever-watchful FCC.



This wave form demonstrates full interlace; first come 50 lines of monochrome characters, followed by 16-color 80 × 50 full interlace graphics.

Color signals will look quite good when they come out of the TBC, but you must consider a few additional factors when preparing to broadcast. One of these factors concerns an oversight IBM made when it designed the composite output of the graphics card. Most broadcast equipment and many newer TV receivers and monitors (including the Zenith ZVM-135) use the back porch of the horizontal blanking interval as a reference for DC restoration. The design of such a clamping circuit causes it to integrate any high-frequency signal on this part of the waveform, thus (for this purpose) ignoring the color burst. Instead of mixing the burst onto the back porch, IBM saved a few pennies by adding it atop the back porch, causing the average DC level in this area to be far too positive. The result, as many have already observed, is that the picture becomes considerably darker in color modes, though not on monitors using the RGB outputs. You can correct this darkening fairly easily in the TBC by adjusting the SETUP control.

When programming for broadcast, then, include within the program, after

SCREEN or WIDTH statements, the line of code displayed at the beginning of this article to select the interlace mode. Remember, when in color modes, colors 1 to 6 are the same luminance level (brightness) as colors 9 to 14. Monochrome TV receivers and monitors will not see any contrast within these groups.

A few more things to keep in mind: A frame synchronizer with heterodyne capability, if available, can also be used to correct the interlaced IBM signal. Also, I have found that a Sony U-Matic TBC will not accept the slightly nonstandard vertical sync from the IBM.

For "Techies" Only

If you are technically inclined, you'll be interested in the following comments. Previously I used "at least" and "about" in referring to numbers that could be expressed quite accurately. Here I give some more precise figures for those of you who may be number freaks.

Thirty years ago, starting with a precolor 60-Hz vertical (used to minimize the appearance of hum bars from the equipment of the time) and a 15,750-Hz hori-

NEW WAVE VIDEO HELP

CAV, a new line of software takes the problems out of producing video as it helps you plan, budget, schedule, write, and edit.

Comprehensive Video Supply Corporation of Northvale, New Jersey, wants to help lighten the video producer's workload. It is offering a line of software packages called CAV, Computer Aided Video. At the moment, the CAV line consists of four software packages: a filing system, a management planner, a script-writing word processor, and an editing aid. Comprehensive says additional ones will appear soon.

Datafax, the electronic filing system, stores all kinds of textual information. This system is handy for filing video scripts, since you don't have to enter your data in a special format. Besides filing, retrieving, and cross-referencing information, *Datafax* does other useful tasks like printing mailing lists.

Associate Producer, CAV's management planning system, is a set of four programs written by Lon McQuillin, a California producer of commercial and educational video. *Production Budget* helps you plan a budget; then *Budget Tracker*, a sort of computerized accountant, keeps track of your expenses after production begins. *Production Schedule* helps you plan the shooting of your video show, and *Program Rundown* creates your program schedule. The computer's ability to calculate is particularly helpful in this last instance. As you enter changes, it instantly recomputes your time schedule, relieving you of tedious paper and pencil calculations.

Powerscript, a word processor for video scriptwriters, was produced by New Yorker David Guest. A video professional, Mr. Guest's primary objective was to make script writing as effortless as

possible, so writers could spend time and energy writing, not juggling pagination, manipulating tabs and margins, or maneuvering the cursor around the screen. *Powerscript* gives you the option of a two-column format so that camera instructions and the words of the script can appear side by side on the printout. If you delete several paragraphs from either the camera column or the script column, the two columns won't lose their alignment. The camera instructions never leave their position alongside the corresponding words of the script.

Martin Spinelli, a New York video producer who uses *Powerscript*, wrote 30 manufacturers of word processors, searching for the product that would best help him write his video scripts. Only five companies responded, and of these, only *Powerscript* could handle the two-column coordination mentioned above. Spinelli feels that the program makes putting your script on paper as trouble-free as possible. In fact, when he started to use *Powerscript*, he found that he no longer needed a secretary.

The final program in the CAV line, *Edit Lister*, is another creation of Lon McQuillin. It takes on the challenging task of video editing. Video editing can be difficult since videotape, unlike film, has no visible picture frames. You must use special equipment to make smooth cuts and joins, and very precise timings are required to produce an unobtrusive cut. *Edit Lister* keeps track of your editing decisions and timings, and, when used with a paper-tape machine (a tape printer) in conjunction with an optional program module, *Edit Lister* can print

out a tape that communicates directly with the final editing equipment.

Bob Weigand of Square 12 Corporation says not only has *Edit Lister* cut down greatly on his editing time (he no longer needs to erase and do multiple recalculations each time he makes an editing decision), but it also gives him the power—and time—to be more creative. Bob recently was asked to edit a 35-second videotape of a haute-couture fashion show. When he saw the rushes, he discovered that the models did not come across well and only 5 seconds of the tape were usable. With *Edit Lister* he was able to slow down the usable part by 7 times its normal rate, filling the 35-second hole and at the same time achieving what he felt to be an unusual and rather breathtaking effect.

Edit Lister can also save a video producer money when it comes to the final edit, which is usually done with equipment that rents at about \$400 an hour and up. *Edit Lister* feeds instructions into the editing machine far more rapidly than can be done manually, cutting down considerably on editing time and thus the rental costs.

You can buy the CAV programs individually, choosing only the package or packages you feel you need. And according to Martin Spinelli and Bob Weigand, Comprehensive Video Supply Corporation supports its customers with high-quality backup. They say that when it comes to answering your questions, the staff, as well as producers Guest and McQuillin, are exceptionally supportive and generous with their time.

—Roz Tobias


```

100 ' INTRLACE.BAS
110 '
120 DEF SEG=&HB800: WIDTH 80: SCREEN 0: OUT 980,8: OUT 981,3
130 FOR ADR=0 TO 8000 STEP 2
140 POKE ADR,33+(ADR/2) MOD 90: POKE ADR+1,7: NEXT ADR
150 IF INKEY$="" THEN 150: ' Hit any key to go on.
160 FOR ADR=0 TO 8000 STEP 2
170 POKE ADR,219: POKE ADR+1,RND*16: NEXT ADR
180 IF INKEY$="" THEN 180 ELSE OUT 980,8: OUT 981,201: CLS

```

This program, written in BASIC, produces interlaced 16-color 80 × 50 graphics.

zontal, RCA/NTSC developed a set of frequencies designed to minimize beats when color was added to the existing monochrome video signal. They began with the 4.500-MHz intercarrier frequency, the difference between transmitted aural and visual carrier frequencies on any TV channel. They then chose an integer that could be divided into that frequency to yield a frequency close to 15,750. The integer they chose was 286, which gave the horizontal the new frequency of 15,734.26573. This number divided by 525 lines per frame produces a frame frequency of 29.97002997 Hz and a field (vertical) rate of 59.94005994. RCA then picked a color subcarrier that would fall between the horizontal-frequency-spaced sidebands of the visual carrier while allowing room for its similarly spaced color sidebands to extend 0.5 MHz on either side (exactly 227.5 times the horizontal frequency, or 3.579545454 MHz).

In practice, the master oscillator in broadcast is at 3.579545 MHz ± 10 Hz or a multiple thereof, and all video frequencies are derived from that. The transmitter frequencies are generated independently, but theoretically all these frequencies could be derived from a single source. All would bear the precise ratios.

IBM derives its frequencies from a 14.318-MHz master clock oscillator on the system board, 4 times the frequency of the NTSC color subcarrier. The clock for the CPU is that clock frequency divided by

3. The Color/Graphics Adaptor divides the master clock by 4 for the subcarrier. But to make both high- and low-resolution modes possible inexpensively, it was simpler to divide the subcarrier by 228 instead of the ideal 227.5 (usually achieved by dividing

When all points are illuminated 60 times per second, persistence of vision smoothes the flicker.

twice the subcarrier by 455). This causes subcarrier cycles on successive lines to be aligned vertically instead of having the usual alternate phase between lines (hence the vertical lines seen in a monochrome monitor on a color signal from the color card).

Monitors and TV receivers with comb filters properly process the chroma; the luminance resolution is slightly reduced, since the scan line is 139.68 nanoseconds too long for the design of their delay lines. For this reason, the receivers and monitors interpret some high-frequency luminance information as chroma and cancel it. TBCs also separate chroma and luminance

using comb filters; they effectively shift luminance timing to match the NTSC frequencies. Because many combinations of pattern and text edges from the PC are at subcarrier frequency, which need not be shifted for NTSC, I had expected to notice roughness on the edges from the PC. But in fact, roughness was insignificant.

If you'd like a programming exercise, switch the interlace selection line to interlace sync and video, yielding true 400-line vertical resolution

```
OUT 980,8: OUT 981,3
```

The 16K of RAM on the board limits practical use of this mode to text applications (it repeats graphics in the lower half of the screen, offset by 584 bytes). In text the result is a 50-line display, with the expected flicker. In practice, you must employ direct memory access to use this mode. The paging ability of BASIC is not usable, although the lower half of the screen is mostly comprised of the next page since IBM uses pages of multiples of 2,000 bytes instead of 2,048. Using the MC6845 directly like this requires direct memory access. It opens up many possibilities, such as producing interlaced 16-color 80 × 50 graphics (see the figure showing the demonstration program), but if you're in BASIC, you're stuck with using POKES to produce them.

That's probably more than you really wanted to know. Good luck, and put your imagination to work on the air!

APPLICATIONS • SCOTT KARIYA

The PC Pied Piper Of North Dallas

Computer expert Father Rudy Koss shares both his love of computers and his PC with the kids in his North Dallas parish. When trying out new games, no one's eyes light up more brightly than his.

Illustration: © Scott Kariya







When Dave Brennan, a sophomore at Pearce High School in North Dallas, Texas, has free time after school or in the evenings, he spends it working on an IBM PC—either writing book reports using *WordPerfect*, learning applications, such as Lotus' 1-2-3 or *dBASE II*, or honing his eye/hand coordination skills by playing *Cosmic Crusaders* or *Laser Maze*. In many ways, Dave's time spent on the PC is similar to that of thousands of other fortunate kids across the country. The one difference, however, is Dave's mentor, whose PC skills are so accomplished that he beta-tests programs for major software developers. Dave's PC adviser also assists local computer stores in evaluating new products and helps local businessmen with difficult application problems. That is, he does all this when he is not saying Mass. Dave's PC guru, Rudy Koss, is a Catholic priest.

Computer Neophyte

At the time Father Koss received his first parish assignment in North Dallas in August 1981, he had no experience with computers. His congregation at All-Saints Church exposed him to micros for the first time and inspired him to develop his first major application.

"I became Youth Minister," recalls Father Rudy, "and I saw the kids' fascination with computers. It was like the early 1960s when a home with a color TV became the center of the neighborhood universe." Parish teens and preteens flocked to the nearest home with a computer. Their fascination fanned his growing interest in computers. "I started coordinating youth activities and found I needed a system to keep track of the large number of kids in my parish." Although he could have turned the task over to the church secretaries, his kids' enthusiasm for computers gave him another idea. "Although it was beyond my budget to buy a computer, I decided a file on the kids would be a good application for a

database," Father Rudy says, adding: "Back then I didn't even know words like 'database.'"

After working for a while with Apple computers belonging to his kids, Father Rudy received a gift from a friend, a Dynasty computer that ran CP/M. He then acquired *Spellbinder*, a word processing package, and *dBASE II*. With absolutely no prior programming experience and only a few poorly written hardware manuals to guide him, he struggled to master the rudiments of his system. "I read everything I could get my hands on about the system, but I wasn't getting too much out of it," he remembers.

Moving on Up

Before long, Father Rudy realized his frustrations were caused by the limitations of his hardware, so he began shopping for a more capable machine. His first experience with computer retailing was rather unpleasant. "I went to a store to look at Apples, and the salesmen wouldn't talk to me. They thought I was looking for a freebie. All I wanted to do was find out what I needed, what the Apples could do, and what they could offer me. But the salesmen were very cool, so I left."

Father Rudy's next stop was CompuShop, an authorized IBM dealership where he knew one of his parishioners worked. He was invited to examine the store's new IBM PC arrivals; the experience led to the start of a beautiful friendship. "I could see right away that the PC had more power and expandability than the Apple," he recalls.

Enlisting the financial aid of several parishioners and putting up some of his own funds, Father Rudy purchased a PC—just 3 months after IBM announced its PC to the world. It was a moderate system, with 64K (on the motherboard), two drives, monochrome display, and matrix printer. Father Rudy purchased IBM's *Time Manager* for appointment scheduling, and he wrote for and received PC-DOS versions of *dBASE II* and *Spellbinder*. And he began reading—every-

thing. "The first thing I did," he says, grinning, "was to subscribe to *PC*. I read it from cover to cover."

Keeping Tabs on Kids

With a roster of over 200 teenagers in the parish, Father Rudy needed the power of a PC and a data management system like *dBASE II* to keep track of names, addresses, and personal information such as birthdates and favorite activities. Using the same programs, he found he could coordinate church activities through PC-generated mailings. He also learned to computerize altar boy scheduling. With over 64 boys eager to serve in the requisite

Father Rudy gets along well with kids because, in many ways, the PC brings out the kid in him.

50 masses needed to receive the prized Bronze Cross award, Father Rudy began to rely on the PC to ensure the fair distribution of slots and to remind him about the due dates of awards.

Father Rudy also began using his PC to write his sermons. "I used to write them out by hand or type them when I could steal away someone's typewriter," he recalls. Now, with *WordPerfect*, his weekly messages almost never appear on paper until just before he delivers them. Like many writers, Father Rudy believes his PC makes his writing not only faster, but better as well.

Another major application employed by Father Rudy was appointment scheduling and time management. After becoming familiar with time management systems through IBM's *Time Manager*, he surveyed the market and decided to pur-

chase *Shoebox*, a comprehensive time management program. Putting his calendar under the control of his PC was not without its drawbacks at first. As one mother in his parish recalls, "Father Rudy was supposed to give a talk at my son's school. But he never showed up, and we couldn't figure out why." She later learned that an accidental erasure had wiped out Father Rudy's day's activities. Now he prints out his calendar several days in advance.

Father Rudy's expertise developed rapidly with the help of local computer experts like Arlene Imberman, who owns a software and peripheral equipment outlet

other professional PC consultants, Father Rudy voraciously reads computer publications. When he hears of a new program that sounds interesting, he contacts the company and offers his services as a beta-tester. By his own admission, Father Rudy is fairly well known in software circles as "that priest in Dallas" who reports bugs and suggests improvements for the next releases. This odd but happy relationship between high-tech entrepreneurs and a parish priest has worked to the mutual benefit of both parties. Companies get a thorough testing of their product, and Father Rudy pores happily for hours over the latest software and saves his money for

Father Rudy's relationship with kids is special. Older parishioners call him "The Pied Piper of North Dallas." The teenagers in his parish relate to him as a peer and as a counselor. Almost every night teens crowd into his small office, with eyes fixed on the PC's monitors.

The PC has become an integral part of Father Rudy's ministry. If he is not using it himself to track altar boy schedules or write sermons, there will be anywhere from a single boy writing a book report on it to a gaggle of youths cheering each other on in some arcade game.

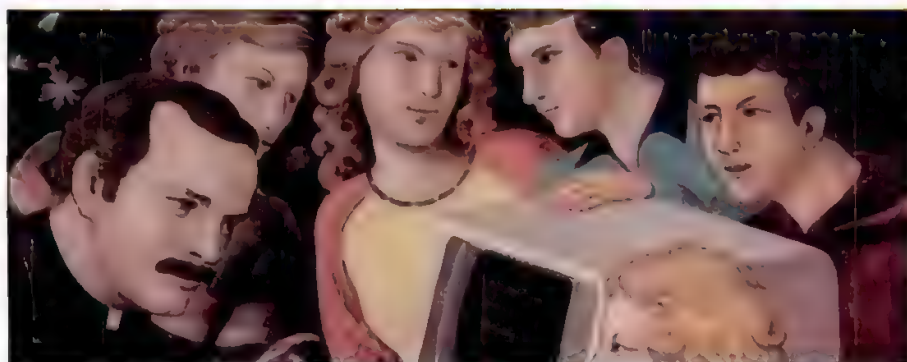
It would appear that one reason Father Rudy gets along so well with kids is that in many ways the PC brings out the kid in him.

Future Looks Bright

Construction has begun on a new rectory that will house a youth lounge equipped with a wide-screen television and nine Apple computers that were recently donated to the church.

And, of course, Father Rudy has plans for more computer work. He'd like to track the people whose lives he's touched through weddings, baptisms, and other church functions. Many of them have moved to different parts of the country or are no longer active members of the church. "I'd like to be able to send these people a note on their anniversaries to let them know the church remembers them," says Father Rudy. "I want them to know they'll always be a part of us."

Then there are the more ambitious projects. Other churches in the diocese already have or are thinking of acquiring computers to aid with administrative work. Perhaps some sort of database linking computers in other churches through telecommunications lines might be a new project for Father Rudy. Fortunately for him, he'll have expert guidance for whatever use his PC is put to next because Entree Computers, the fast-growing national chain, recently opened a Dallas outlet across the street from All-Saints Church. Divine providence? ■



three blocks away from All-Saints Church. Father Rudy called her to inquire if she stocked word processing programs. He went over, purchased some programs, and returned home. When he called back the next day to report problems in running the programs, Imberman went to the church to assist. "One thing led to another," she recalls. "Within the next 3 or 4 months, I was talking to him almost daily." Imberman became Father Rudy's PC counselor, but it did not take very long before the tide turned. "Instead of my recommending programs to him, he began recommending new things to me," Imberman says. "He uses his computer probably more than anyone else I know." Father Rudy is the only person Imberman knows of who has had to replace his keyboard because of wear and tear.

Besides conferring with Imberman and

his next hardware purchase.

Father Rudy sold his first PC over a year ago to purchase the "PC-2" with 256K memory capacity on the motherboard. It was a harbinger of things to come. Father Rudy's small office may hold some record for the "most computer gear per square foot." His setup now consists of two monitors, one color and one monochrome, the system unit, and a hard disk expansion chassis. He still has his first Okidata printer but now does most of his letter printing on an NEC Spinwriter and a newly acquired sheetfeeder. His modem connects him with The Source and CompuServe. Software manuals vie with religious books for space on his bookshelves. But oddly enough, it is not hardware or software alone that excites Father Rudy's interest in computers. His kids have played a major role, too.

Accounting For Individual Tastes

Designed for very small businesses, Rags to Riches offers spreadsheet features that strike a happy medium between structure and flexibility.

From rags to riches—the dream of many a small-business entrepreneur. But when the entrepreneur isn't dreaming of success, he or she must wear any number of hats in starting and running a new business. Unfortunately, one of them belongs to the bookkeeper, and bookkeeping expertise doesn't come with the hat!

Many budding entrepreneurs (and those who simply need to account for one or more "personal" investments) balk at the thought of having to deal with a highly structured, computer-based accounting system. As a result, many who choose to do their own books do so manually. Some use a spreadsheet—although this method often proves to be awkward and ineffi-

cient. Is there no middle ground between a totally unstructured spreadsheet and a highly structured, automated accounting system?

Chang Laboratories Inc. (long known for its CP/M-based productivity software line) recognized this dilemma. The company went to work on the problem and developed a unique accounting system designed for very small businesses: *Rags to Riches*. Originally released in July of 1984, *Rags to Riches* is targeted squarely at the small business with just a few employees.

The key to the system is that it allows you to input data and observe the results immediately. And we mean immediately! Although *Rags to Riches* lacks the analyt-





Illustration: Carter Goodrich

INDIVIDUAL TASTES

ical capabilities of an electronic spreadsheet, the designers wanted to give the system a spreadsheetlike feel. So the bottom half of the screen is dedicated to a condensed presentation of your profit/loss statement and balance sheet. As you enter transactions, the program immediately presents the bottom-line financial impact of the transaction. It can do so—on-screen in real time—because it is a memory-resident (RAM-based) system. That is, all your data and your account balances are maintained in memory, just like an electronic spreadsheet.

With the exception of a very few functions (such as check writing in the Payables module), nothing is done in batches. Each transaction is posted individually, and account balances are updated the instant you enter it. This makes for an unusual and interesting product. One of the objectives of continually displaying the changing financial statements is to tutor the businessperson who may not be quite sure what effect an entry will have on account balances or financial statements.

Flextime

In accounting, we normally deal in specific reporting cycles; the books are "closed" at the end of each period. With *Rags to Riches*, you never really close the books. As discussed above, all transactions are posted immediately upon entry. However, they are posted to the "current" amount (the account total). You can continue posting transactions, and they will continue to accumulate in the current account field, until you decide to update your current data. When you perform this update, the current amount fields



Rags to Riches

Chang Laboratories Inc.
5300 Stevens Creek Blvd.
San Jose, CA 95129
(408) 246-8020

List Price: \$99.95 per module

Requires: 128K RAM, one 360K disk drive, PC-DOS 2.x.

Command Reference				
DATA	AUDIT	FILES	EDIT	SUMMARY
DEPOSIT	CLEAR	OPTIONS	Asset	CLASS
CHECK	EDIT	EXIT	Liabili	Asset
MONEY	POST	UPDATE	N/Worth	Liabili
PAYABLE	REVERSE	CURRENT	Income	N Worth
TRANSFER	NEXT	M-T-D	Expense	Income
POST	LAST	Y-T-D		Expense
REVERSE		MERGE		PRINT
NEXT		Sales		TOTALS
LAST		Receive		CURRENT
		Payable		M-T-D
		LOAD		Y-T-D

F1 Cancel	F3 Line Begin	F5 Delete Character	F9 Command Help	ESC Menu	Move Cursor Left	Move Cursor Right
F2 Delete Line	F4 Line End	DEL	F10 Switch Help Level	Backspace Delete to the Left	Up	Down

*With the PCjr you must depress the Fn (Function Key) before using the F1-F10 keys.

Figure 1: The Rags to Riches Quick Reference Card. Each module has one.

for each account are "rolled forward" (added) to the respective M-T-D (month-to-date) fields, and the current fields are cleared to zero. You can continue entering and accumulating current transactions and updating these amounts into the month-to-date fields until you want to update those month-to-date amounts into the Y-T-D (yes, you guessed it—year-to-date) fields.

Consider the analogy of three buckets. As you fill up the first bucket, you can empty it into a second, larger bucket at any time you choose. As the second bucket fills, you may choose to empty it into the third, or largest, bucket. At the end of the year, you will empty the largest bucket onto the ground and start anew.

It is not unusual that you can control when updates occur. What is unusual is that this system is not at all date sensitive. The dates associated with your financial transactions do not determine the accounting period they have an impact on. The calendar, in general, is left up to you. With a few exceptions, transaction dates have no meaning to the system. The assumption is that you will keep things straight and logical as far as dates are concerned. The system's responsibility is to maintain the chronology of the journal entries and to make sure you balance your debit and credits. This gives you a great deal of flexibility and responsibility.

Giving Credit for Debits

The system's method for entering financial transactions helps keep your books in balance. A debit-credit transaction is specified by entering two different accounts and a single amount. This amount is debited and credited to the two accounts respectively. Your books *cannot* be out of balance, but neither can you enter transactions for which there are multiple debit or credit accounts—such as a loan payment transaction in which your checking, interest expense, and loan payable accounts are all affected. This may prove frustrating. However, splitting these transactions into two or three entries may be a small price to pay if you have trouble balancing your statements and have few complex transactions.

Rags to Riches resembles a spreadsheet in a number of ways. For instance, if you use Lotus's 1-2-3, you are likely to feel right at home with the horizontal command menus and edit functions. As with RAM-based spreadsheets, *Rags to Riches* gives you the option of loading or storing data on diskettes separate from the program files. However, because all the data is memory resident, you'll need to remember to save it frequently.

Another spreadsheetlike feature you'll be pleased to see is that you can enter simple formulas in amount fields when you're entering numeric data. These formulas are

limited to one math function and a single percentage calculation. The following formulas would be legal: for an interest amount, 10 percent \times 14,000; for a discount amount, 490.00 $-$ 15 percent; for a surcharge amount, 37.20 $+$ 10 percent. As you can imagine, this can come in handy in entering transactions associated with sales tax, discounts, and the like.

A Help key is available to display additional information regarding a particular command—although you'll need the reference manual as well. In addition to this on-call help facility, there are three levels of constant on-screen help, which give you strong incentive to graduate quickly to the expert level. The beginning level obscures the "results" part of the screen. You'll soon not need that much help. The intermediate level features a one-line message continually scrolling from right to left on the screen. It is a little hard to stomach; it's like trying to enter your accounts while sitting on a turntable!

Because the system is RAM-based, you may run out of room for your transactions. However, you can enter about 1,000 transactions before this becomes a problem. A number displayed in the lower left-hand corner of the screen indicates about how many transactions you can add before you need to do some housekeeping. If you do bump up against your system's memory capacity, you'll have to follow the procedures outlined in the documentation for "clearing" (deleting) some of your transaction detail.

The *Rags to Riches* bookkeeping series includes General Ledger, Accounts Payable, Accounts Receivable, and Sales modules. You are able to use each module on a standalone basis if you wish. However, the latter three modules can give you financial data for the General Ledger module.

General Ledger

Integration of your accounting data is straightforward and easy to accomplish. Within the subsidiary modules (Payables, Receivables, and Sales), you simply

establish accounts consistent with those in the General Ledger. Then, using the merge function within the General Ledger, you merge into your ledger accounts the financial data residing in these subsidiary modules.

Once you understand the general approach of the *Rags to Riches* software, the General Ledger module is relatively simple. Figure 1, which illustrates the command reference card for this module, contains a complete outline of the menu options.

One of the most appealing aspects of this "low-end" accounting software is the manner in which you define your financial accounts. Most traditional accounting software uses numbers for account codes. For example, your cash account might be account number 100, your petty cash account, 110. Targeting this system for the very small business, the developers of *Rags to Riches* recognized that these businesses seldom need more than, say, 100 different accounts to adequately segregate their accounting records. So they chose to allow the user to assign a single character as the code for each account. Because special characters can be used and both uppercase and lowercase letters are distinguished in this scheme, you can create up to 96 different financial accounts. This feature significantly increases the speed with which you can enter accounts. More importantly, it allows you to search for the right account as you are entering the account code. You simply "let your fingers do the walking." As you step across the keyboard tapping each key, the account description associated with that key will appear. When you've found the right one, you just hit Enter.

By including some 30 complete charts of accounts for representative small businesses, *Rags to Riches* gives you a hint of what accounts you will need. The businesses covered run the gamut from bicycle shops to restaurants and are sure to make it easier for you to get started—you'll probably be able to modify and use one of the model charts provided.

In establishing your financial accounts, you must indicate to which account class each one belongs: Assets, Liabilities, Income, Expenses, or Net Worth. On a color monitor, each of these classes and its related accounts and transactions are presented in a common color. You can also assign to each account a subclass code (from 0 to 9), which will serve to group accounts in the financial statements.

To set up your accounts, you can input current, month-to-date, or year-to-date balances or start at zero. For initializing your accounts, this is helpful, but the ease with which you can subsequently alter these balances—with no discernible audit trail—may be of concern to you. It is of concern to us.

There's no budgeting capability or accompanying variance analysis showing the difference between budgeted and actual figures.

Transactional Analysis

Transactions are entered with one of five options: Deposit, to record a cash receipt; Check, to record a cash disbursement (via check); Money, to record a cash payment; Payable, to record an obligation due a vendor; and Transfer, to record a general journal entry.

As you enter a financial transaction (two accounts, an amount, and a memo description), the system reports the net result of the transaction in lay terms. For example, if you make a payment crediting cash and debiting expenses, the message will flash "+ Expenses."

The Audit command submenu options enable you to locate, correct, or reverse any transaction within a particular account. You can review these transactions by entering the account key. You can also print a detailed audit trail list of all current transactions. Again, the ease with which entries can be changed and reposted or reversed is appealing—as long as you take measures to ensure the control and the accuracy of these changes.

If you locate a transaction you know to be incorrect, you are able to freely modify

the information on display and post it. However, you would do well to reverse this incorrect entry before making any changes to the transaction. Otherwise you may alter the transaction, post it, and lose track of the original entry, which must still be reversed.

You can review your account balances at any time. Two fundamental accounting reports are available from the ledger module: the Chart of Accounts and the Audit Trail.

The Chart of Accounts (See Figure 2) is a listing organized by class and subclass with current balances, subtotals, and totals. It serves as your Income Statement and Balance Sheet and can be produced with the current, month-to-date, or year-to-date amounts. The Audit Trail is an audit trail listing for a particular account that will show all current transactions. You can also produce a transaction backup report, which shows the complete chronological detail for all the accounts in the General Ledger file.

Accounts Payable

With the Accounts Payable module, you can maintain vendor and invoice information, print checks, and produce several useful reports. In addition, the on-screen summary (the bottom half of the screen) displays instantaneous updates to and an aging for the vendor accounts you are affecting with your entries.

As with the General Ledger, accounts are set up (in this case for each vendor) through the Edit command series and are assigned a single-character ID. You can enter a vendor's name and address for use later in printing checks. You will also be prompted to input a phone number, a subclass grouping (again, 0 to 9 for ordinal grouping), payment terms, and a memo. The system will automatically accumulate, for each vendor, Y-T-D payments and purchases.

Figure 2: *The Rags to Riches General Ledger Chart of Accounts report. It functions as your balance sheet and profit/loss statement.*

The Bicycle Place Chart of Accounts		
BALANCE SHEET		
ACCOUNT	CURRENT	PERCENTAGE
Asset		
c Petty Cash	75.00	0.4
k Checking Account	3,904.32	17.3
v Accounts Receivable	951.75	4.2
Subtotal 0	4,931.07	21.8
i Inventory	2,000.00	8.9
f Fixed Assets	15,652.93	69.3
a Other Assets	0.00	0.0
Total	22,584.00	100.0
Liability		
y Accounts Payable	1,202.26	9.2
q Equipment Loan	11,850.12	90.3
t Taxes Payable	0.00	0.0
Subtotal 1	11,850.12	90.3
m Company Credit Card (MasterCard)	73.70	0.6
Total	13,126.08	100.0
N/Worth		
p Proprietor's Account	0.00	0.0
Total	9,457.92	100.0
Income		
INCOME STATEMENT		
5 Sales/Service Revenues	1,500.00	100.0
x Other Income	0.00	0.0
Total	1,500.00	100.0
Expenses		
g Cost of Goods	0.00	0.0
o Office Supplies	27.02	6.1
r Rent	375.00	84.1
u Utilities	43.78	9.8
Subtotal 0	445.80	100.0
d Depreciation Expense	0.00	0.0
e Credit Card Fees	0.00	0.0
n Interest Expenses	0.00	0.0
z Other Expenses	0.00	0.0
TOTAL	445.80	100.0
Est. Profits	1,054.20	

The Bicycle Place**Account Master**

ACCOUNT	CURRENT	PERCENTAGE
Media		
1 Cash	508.45	77.9
2 Check	10.00	1.5
Subtotal 0	518.45	79.4
3 House Charge	0.00	0.0
4 MasterCard	77.55	11.9
5 Visa	56.50	8.7
6 Diners Club	0.00	0.0
7 American Express	0.00	0.0
Subtotal 2	134.05	20.6
8 Mfg. Coupon	0.00	0.0
Total	652.50	100.0
Liability		
Tax 1 Collection	37.70	100.
Tax 2 Collections	0.00	0.0
Subtotal 0	37.70	100.0
Total	37.70	100.0
Transfer		
b Loans to Register	0.00	0.0
n Pickups from Register	0.00	0.0
Total	0.00	100.0
Sales		
a Bicycle Sales	519.90	83.2
d Accessories	59.90	9.6
g Miscellaneous	0.00	0.0
s Special Orders	0.00	0.0
Subtotal 0	579.80	92.8
f Parts	10.00	1.6
h Labor	35.00	5.6
Total	624.80	100.0
Discount		
x % Discount	0.00	0.0
z \$ Discount	10.00	100.0
c Store Coupon	0.00	0.0
Subtotal	10.00	100.0
TOTAL	10.00	100.0

As with the other modules, you use the Data command to enter all transactions. In the case of Accounts Payable, there are options to record invoices, manually prepared checks, and debit or credit memos adjusting vendor accounts. In each case, the transactions are recorded the instant you instruct the system to post them.

Each item on your vendor's invoice can be charged to a separate financial account if necessary and will thus be posted to individual corresponding accounts in the General Ledger when you merge your payables transactions into the ledger. Itemized entries are linked by a common invoice number so you can account separately for purchase subtotals, shipping charges, sales tax, and so on.

In entering invoices you may opt to specify a "print check" date. This is the one instance in which *Rags to Riches* will be sensitive to a date. If you don't wish to use the automatic check-writing feature, you can leave the date for printing the check blank.

But if you do use this feature, the automatic check-writing function will identify all amounts due for payment on or before the current system date and will print checks accordingly. Any two or more obligations due the same vendor will be combined onto a single check. Unfortunately, there's no opportunity to preview a listing of the checks selected for printing, and so you may end up having to void some checks. Further, the system does not list the checks that have been printed; it gives you only the checks themselves. As checks are processed, the system will automatically adjust the accounts to reflect the disbursements.

The payment function can be used to record your having paid, with a handwritten check, an obligation previously recorded as an amount due to a particular vendor. When you do so, you are asked to

Figure 3: The Account Master listing produced by the Sales module. It summarizes all your accounts, arranged by account class. This listing can be produced with the current month-to-date or year-to-date data.

enter the vendor and the invoice number. The updated (net) balance due for that particular invoice will be displayed on the bottom half of the screen. Debit and credit memo adjustments are entered in the same fashion.

To assist you in dealing with one-time-only vendors, the space bar on your keyboard is used to represent miscellaneous vendors. Vendor-specific information—the address, phone number, and the like—is left blank. However, if you enter the vendor name and mailing address in the memo field, the automatic check writer will use this information in printing the check. When entering transaction data for these vendors, use the space bar to bring up the Miscellaneous Vendors account. Enter the amounts, dates, and so on as usual.

As with the other modules, when you finish entering data in Accounts Payable, you can opt to post it, reverse it, or examine other payment transactions. There is no way to review a group of transactions and post them all as a batch.

Using the Audit command, you can examine all outstanding invoices for a specific vendor. When the command is first entered, the screen displays the last vendor examined. To examine a different vendor, you would simply press the appropriate vendor key. After reaching the right vendor, you can go one step further and examine the details of a specific invoice.

Reports available from this module include the Vendor List, a complete summary of vendor data; the Payables Aging Report, a report that lists all payables by individual vendor and by aging group (aging groups are 0–30, 30–60, 60–90, and 90+ days); and the Invoice Aging Report, the same report as above, but showing individual invoices with subtotals for each vendor and each subclass.

Accounts Receivable

The Accounts Receivable module works much like the Accounts Payable one. It is designed to maintain customer files; record billings, cash receipts, and

customer account adjustment transactions; and generate customer invoices. Customer files are created through the Edit commands and, as you might expect, are assigned a single keyboard character for identification purposes.

For each customer, you can enter the customer's name, address, phone number, and credit terms, a subclass for ordinal grouping (to, say, group customers by common credit term relationships), and a text memo. The system will automatically maintain balances for each customer's

The Sales module
is designed to
transform your PC
into a point-of-
sale register that
handles change,
figures taxes, and
computes refunds.

year-to-date purchases and payments. The bottom half of the screen is dedicated to an aging report for a specific customer or for all customers.

Using the data function, you can record customer invoices, cash receipts, and credit or debit memo adjustments to customer accounts.

When entering or modifying customer invoice (billing) data, you can itemize specific line-item charges (for example, merchandise purchased, sales tax, and handling charges) and have these recorded against individual ledger accounts. Cash received in payment of a previously entered customer invoice can be recorded against that invoice, reducing its balance accordingly. Debit and credit memos can be used to adjust customer balances as well.

When a payment is received, you should record it against the appropriate

invoice. You can call up invoices to identify the one to which a payment applies. The system does not prevent you from inadvertently applying a payment against a nonexistent invoice number.

The Audit command series allows you to examine all the invoices and receipts for a particular customer and displays the resulting customer balance. Outstanding invoices for that customer are aged on the bottom of the screen. It's easy to picture an owner-manager telephoning a series of customers to encourage payment, all the while referring to the screen display of the transactions specific to that customer.

Before printing your customer invoices, you can examine them on your screen and can alter any as needed.

The following reports are produced by this module: the Customer List, a listing of all of the information pertaining to each customer; the Receivables Aging Report, a listing of all customers with outstanding invoice balances (balances are aged, and subclass groupings and subtotals are presented); the Invoice Aging Report, which is the same as above but shows individual invoices; and the Receivables Statement, a recap of the outstanding invoices for a particular customer.

Sales

The Sales module may be of particular interest to you if you're a retailer. It will assist you in accounting for and analyzing sales transaction data. Its developers have focused on the problem of recording sales transactions at the point of sale (that is, over-the-counter retail sales transactions). It's designed to be used in conjunction with an electronic cash box and to transform your PC into a point-of-sale register that handles change, figures taxes, accommodates various forms of payment, and computes refunds. This is not to say it cannot also be used by very small wholesalers.

The merge function enables you to combine transaction data recorded on various diskettes. This allows you to use several PCs in recording your point-of-sale

transactions and then merge this sales data from the various PCs into your general ledger.

The Sales module does more than record sales transactions. It helps you summarize how customer payments were made. The form of payment (cash, charge slip, or whatever) is recorded as you enter sales, returns, adjustments, and so forth.

Two financial reports are available from the Sales module: the Account Master Report (see Figure 3), a basic listing of all your Sales module accounts with current balances, totals by classifications, and percentages of those totals; and the Audit Trail, a list of all current transactions for a specific account, showing the transaction number, memo comment, transaction total, and account totals.

Installation and Documentation

Each of the four modules requires approximately 50K for the program files, and so all four modules would fit on one floppy. But disk space would become precious, and your backup procedures would become even more vital.

The documentation for each module is contained in a spiral-bound book of about 100 pages. We found a few inconsistencies in the index, and some of the exhibits were one or two steps ahead of or behind the narrative. But, on the whole, the documentation is adequate. A very helpful tutorial is included with each module. The command reference section is an excellent resource once you've become familiar with the system.

The *Rags to Riches* accounting software brings a unique spreadsheetlike approach to the task of keeping the books for a very small business. It would be too limiting for many small businesses needing a more formal, "traditional" accounting system. On the other hand, it does represent an alternative you might consider to keep account of your personal investments or to use in a very small business with a limited number of transactions and minimal reporting requirements.—G. William Dauphinas and Glen Seller

SOFTWARE ADVISOR'S

telasoft

CALL TOLL FREE 1-800 IBM ONLY

We Now Ship



• Order Line 1-800-426-6659
 • Order Processing & Other Information 602.224.9345
 • Order Line Hours Mon-Fri 8:30 - 5:30
 Saturday 9:00 - 1:00
 Address 1943 East Indian School Road
 Box 194
 Phoenix, Arizona 85016



- No Charge for VISA and Mastercard
- Shipping and Handling Add \$7.00 for Federal Express standard air or \$5.00 for UPS Ground to Total Order
- Personal and Company Checks Will Delay Shipping 2 weeks
- COD Orders Add 2% - \$250.00 Minimum
- Call on Purchase Orders
- Prices & Availability Subject to Change Without Notice
- We Do Not Guarantee Machine Compatibility

Framework \$339
 dBase III \$339

Word Perfect (Ver. 4.0) . \$225
 Supercalc 3 (Ver. 2) ... \$175

WORD PROCESSORS		MONEY MANAGEMENT	
Bank Street Writer	\$ 49	Dollars & Sense w/Forecast	\$ 99
PFS: Write	79	Tobias' Managing Your Money	109
Leading Edge Word Processor	59	Home Accountant Plus	82
PFS: Proof	55	COMMUNICATIONS	
The Word	225	CompuServe Starter Kit	\$ 23
The Word w/ Mouse	265	Crosstalk XVI	98
Volkswriter Deluxe	149	PFS: Access	55
Word Plus Spell Checker	90	SPREADSHEETS	
Wordstar w/ Tutor	175	Multiplan	\$119
Wordstar 2000	239	Chart	150
Wordstar 2000+	289	PFS: Graph	79
Wordstar Pro Pack	245	PFS: Plan	79
Wordstar Pro Option	125	PFS: Report	71
UTILITIES		DATA BASE MANAGEMENT	
Concurrent PC DOS	\$179	Advanced DB Master	\$357
Copy II PC	25	dBase II	249
Desk Organizer	115	dBase Manager II	165
Energraphics	199	Friday	165
Norton Utilities 3.0	Call	Knowledgeman	275
Prokey 3.0	79	K-Paint	60
Sidekick	35	K-Graph	135
Sidekick (Unprotected Ver.)	55	K-Text	105
Sideways	35	Nutshell	89
LANGUAGES		PFS: File	79
Basic Interpreter (Microsoft)	\$210	Power-Base	229
Basic Compiler (Microsoft)	240	Quickcode III	145
Cobol Compiler (Microsoft)	420	R: Base 4000	249
Fortran Compiler (Microsoft)	210	R: Base Clout 2	135
Lattice C Compiler	285	R: Base Extended Report Writer	89
Pascal Compiler (Microsoft)	180	Think Tank	99
Macro Assembler (Microsoft)	60	PROJECT MANAGEMENT	
Turbo Pascal	35	Harvard Project Manager	\$210
Turbo Tool Kit	35	Project	150
TRAINING		INTEGRATIVE SOFTWARE	
Flight Simulator (New Version)	\$ 32	Electric Desk	\$189
Speed Reader II	45	ACCOUNTING	
Mastertype	30	BPI General Accounting	\$359
Mind Prober	32	BPI Accounts Payable	335
Typing Instructor	30	BPI Accounts Receivable	355
Typing Tutor III	30	BPI Payroll	359
		In-House Accountant	Call

Symphony \$409
 Lotus 1-2-3 \$289

Multimate \$259
 Smart Software System \$499

CALL FOR A FREE SUBSCRIPTION TO THE SOFTWARE ADVISOR

Announcing
the sudden obsolescence
of the floppy disk.

NEW **HELIX PC BUBBLE DISK™**

HALF-MEGABYTE MEMORY BOARD

The first bubble memory board for
IBM PC/XT and compatible computers.

- NON-VOLATILE: You don't lose data when there is no power.
- Eight times faster than a floppy disk.
- For fixed or portable use without need for back-up storage.
- Impervious to dust, dirt, humidity, cold—as reliable in the North Sea, the Sahara, a Space Station, as in your office.
- Mean time between failure (MTBF) more than 20 years.
- Rugged enough to withstand vibration and shock up to 200Gs.
- For complete details, contact HELIX



Helix Laboratories, Inc.
8123 Remmet Ave., Canoga Park, CA 91304
(818) 710-0300—outside California, 800-468-0004
Dealer Inquiries Welcome

CIRCLE 247 ON READER SERVICE CARD

© 1984, Helix Laboratories, Inc.

Enable Does It Right



Offering true integration among all of its applications modules, Enable is everything Symphony hoped to be.

As with so many other buzzwords in business, the word *integration* has come to mean all things to all people. Manufacturers have been selling integrated packages for quite some time now; some of these packages, however, fall somewhat short of the ideal. For example, different applications may be packaged as one system but fail to share the same commands, the same screens, or even the same files.

Integration is important because most business documents use a combination of text, numbers, and graphics. The added expense of training people to use many different packages instead of one integrated package is enough to make integration cost-effective, all by itself.

Until now, though, there have been only a limited number of packages that offer true integration among applications. The best-known of these offerings, *Symphony*, by Lotus Development Corporation, has had mixed reviews. Critics of *Symphony* say it is not full-featured enough and not very easy to use. *Enable*, by The Software Group, may be the package *Symphony* was supposed to have been.

Enable offers four complete application packages, or modules, in one. Each module—word processing, spreadsheet/graphics, database/graphics, and telecommunications—could stand as a full-powered application in its own right. Together, they offer a powerful production tool that can serve everyone in the office, from data entry personnel to the vice-president of marketing.

Each module shares the same command structure and has additional commands for specialized functions. *Enable* offers full integration among the modules and relies on windows to achieve its integration. Spreadsheet cells, database records, and graphs can easily be copied into text files (see Figure 1), and database records can be copied into the spreadsheet cells. You can easily put up to eight win-





dows on the screen at once. *Enable* is sleek, too. The package comes on three disks, one of which is the tutorial. The code is compact as well, and the action is fast. The program runs on a standard PC with 192K RAM.

Fitting the Pieces

The key to *Enable*'s speed and functionality lies in the Master Control Module (MCM), the layer above DOS that supervises all activity in the program and isolates the user from the operating system. Since the MCM performs certain operations faster than DOS, the elimination of this overhead contributes to *Enable*'s speed.

The MCM contains all the common application functions so the applications are not encumbered with redundant code. This means you need less RAM, both for each module and in order to run the product as a whole. It also allows more work to be done in RAM, avoiding relatively slow disk access tasks that degrade performance. *Enable*'s speed and efficiency also owe something to the fact that the entire program is written in assembler language.

The MCM easily handles hardware interrupts as well as scheduling tasks and events. It can handle interrupts for complicated spreadsheet calculations while capturing incoming information from the telecommunications module. More significantly, the MCM was designed from the outset to handle multiple users simultaneously performing multiple tasks. The MCM is your sole interface to the pro-



Enable

The Software Group
Northway Ten Executive Park
Ballston Lake, NY 12019
(518) 877-8600

List Price: \$695

Requires: 192K RAM, two disk drives, graphics adapter, DOS 2.0 or 2.1.

CIRCLE 787 ON READER SERVICE CARD

gram, whether you input through the keyboard or by way of the telecommunications module.

Specifically, the MCM is in charge of windowing, file management, macros, and profiles (system-wide, user-defined configuration specifications). You can work on three different applications concurrently.

Using the profiles, you can configure certain of the system's default aspects, such as hardware, modem settings, page size, margins, and whether or not to create back-up files. You may use the standard profile or create your own.

Enable opens with a sign-on screen, where you can enter the date, time, and name of the profile you wish to use. Next, the main menu appears (see Figure 2). You choose the "use system" option to proceed to the various applications. Each application allows command entry using a top-line menu that appears after the F10 key is pressed. Most commands can also be entered by pressing a series of two to three keystrokes, called expert commands. All expert commands are invoked with the F9 key. Beginners may start with menus, but as they gain familiarity with the program, they can switch to expert commands.

Although *Enable*'s command structure is, for the most part, logical and easy to follow, the sheer size and power of the system could intimidate novices. However, at least one computer dealer thinks that *Enable*'s primary selling feature is that it's easy to use. It may seem as complex as *WordStar* at first, but once you learn the basic commands, you can immediately use all the application programs.

Enable has some slick touches, such as the ability to use files from other programs. A *WordStar* file read into *Enable*'s word processor, for example, keeps its bold and underline attributes, although some esoteric *MailMerge* dot commands are not translated. You also can use files from *dBASE II*, *1-2-3*, *VisiCalc*, *Volkswriter*, and *EasyWriter I*.

Each of the full-featured *Enable* appli-

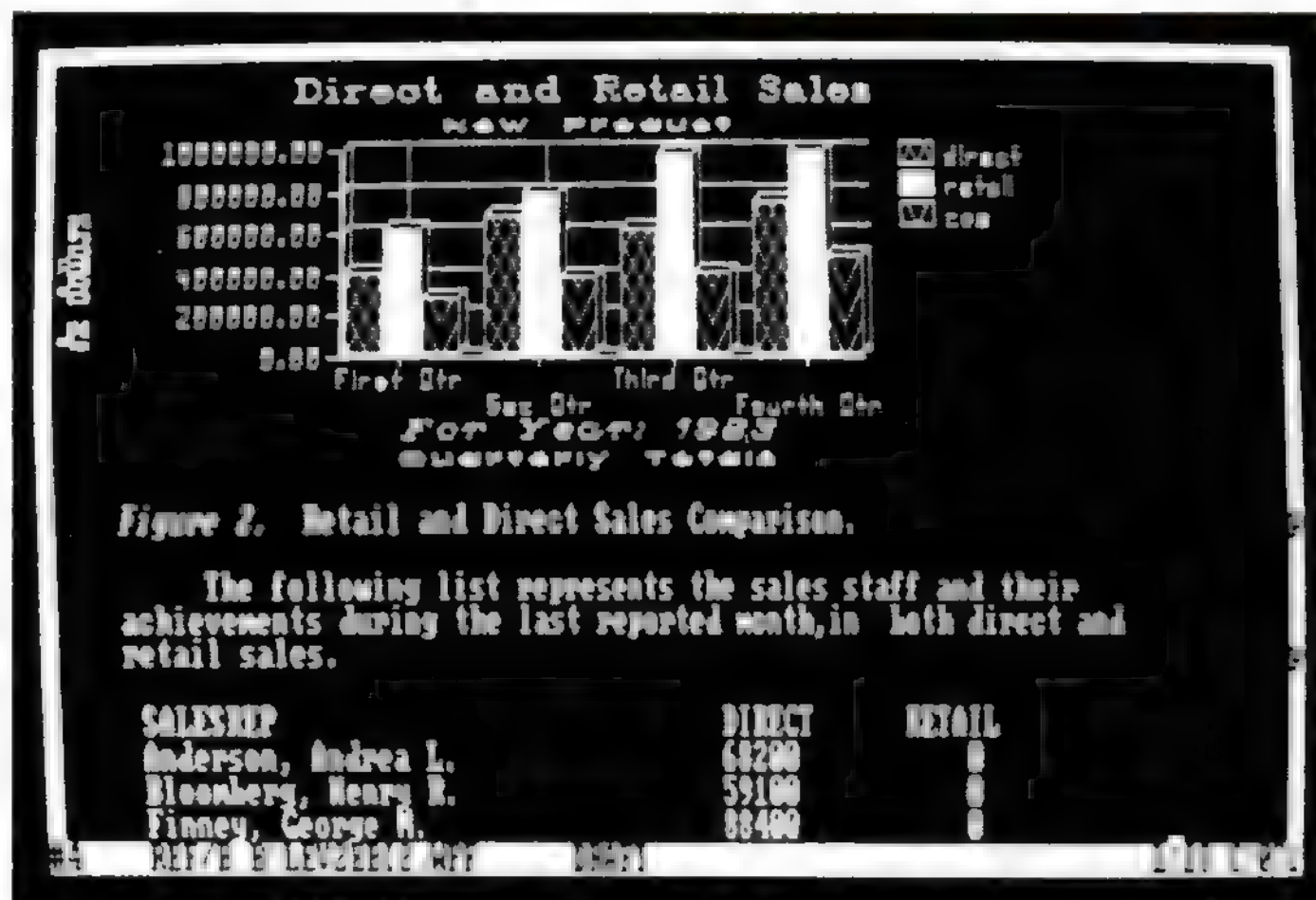


Figure 1: *Enable* allows you to paste graphs and spreadsheet files directly into a word processing file.

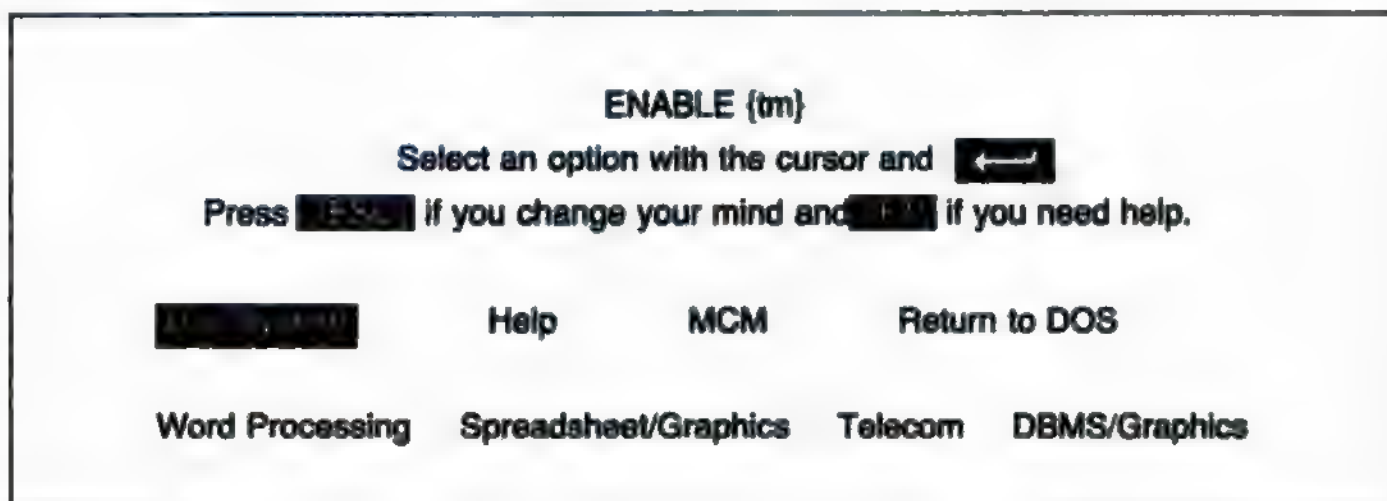


Figure 2: *Enable*'s Main Menu lets you choose which type of application window you wish to open.

cations deserves its own review, but there is room here only for a quick overview of how the modules interact and a description of some of their unique features.

The Word Processor

Enable's word processor offers just about everything you could ask for. The top-line menu, invoked by pressing F10, offers options for many functions, including inserting headers and footers, copying text, deleting text, search and replace, printing, saving, and access to the Master Control Module. Many of these commands can be entered by pressing the F9 expert command key followed by a one- or two-keystroke sequence.

With just a few commands, you can copy spreadsheet, database, or graphic information into your text document. You can work on two different text files simultaneously, and *Enable*'s windowing system makes the process easy. Document size is limited only by disk space.

Enable does not change data dynamically. For example, changing spreadsheet data in one window, does not alter the spreadsheet data you have copied in a text file.

The word processor is rich with commands—inevitable in a program so full of features. However, because the command structure is similar to other modules, it doesn't take long to learn to work quickly.

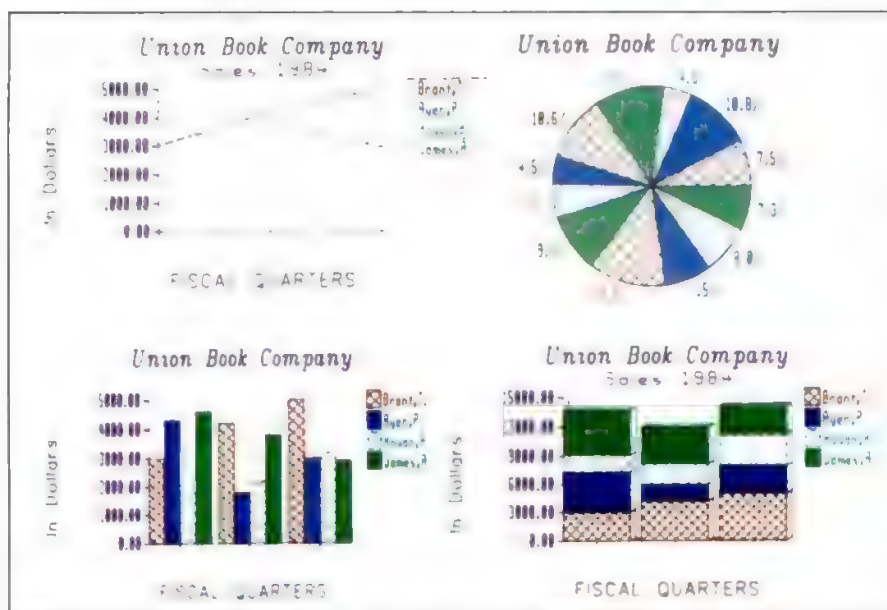


Figure 3: Enable can create vertical bar charts, pie charts, and line charts. These were output to a Hewlett-Packard plotter.

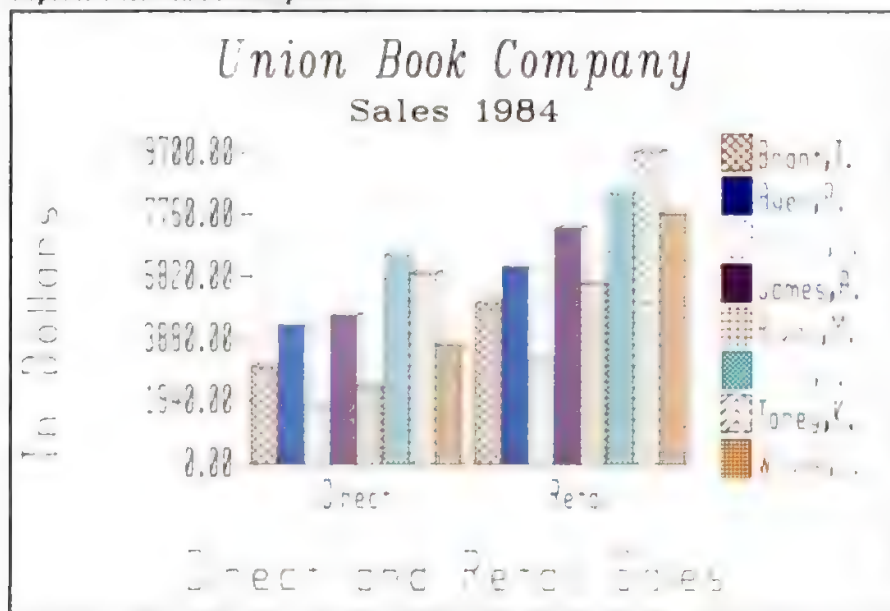


Figure 4: Classy-looking three-dimensional bar graphs are a standard option.

In fact, this article was written using *Enable*, which involved a tearful abandonment of the time-honored *WordStar*.

Print attributes are assigned by pressing the Alt key plus a letter key, such as B for bold or U for underlining. Most attributes are displayed on the screen. Bold type looks bold and doesn't have any extra control characters cluttering up the screen the

way *WordStar* does. *Enable* supports almost 20 different printers, including the Hewlett-Packard LaserJet and the NEC Spinwriter. It also supports different Hewlett-Packard plotters.

Enable's word processor offers some valuable features that help to produce long, complex documents. Automatic footnoting is available, along with options

for footnotes at the end of each page or the end of the document. "Paper clip" markers can mark spots in your text. You can also insert comments that will not appear in your final printout. Letters can be merged with files from the database for producing mass mailings.

The menus provide for another exciting feature, which is not yet available. Automatic generation of an index and a table of contents is planned for the first update, to be released in February 1985.

Spreadsheet/Graphics

Enable's spreadsheet offers a 255-row by 255-column work space. The command structure is similar to that of *1-2-3*, but a main difference is that *Enable's* graphs are considerably easier to print out. A few keystrokes do the trick, and disk-swapping is unnecessary.

Enable includes most typical spreadsheet features, such as the ability to name ranges, to print headers and footers, and to combine spreadsheets. Common mathematical and financial functions are available, including +PMT (payment per period), +PV (present value of an annuity), and +IRR (internal rate of return). Fields from database records can be copied into the spreadsheet area, and the spreadsheet automatically adjusts the format of the cells to match the format of the information copied from the database.

You obtain the graphing function by choosing the Graph command from the top-line menu, which leads to a series of other prompts. You can create vertical bar charts, pie charts, and line graphs (see Figure 3). While you cannot graph horizontal bar charts, the vertical bar chart menu offers the option of producing three-dimensional bars, which gives charts a classy look (see Figure 4). Alas, you cannot access the graphing function using the expert commands; you can only do so through the menu.

The DataBase/Graphics Module

You may be thinking that the DBMS must be *Enable's* Achilles' heel. After all,

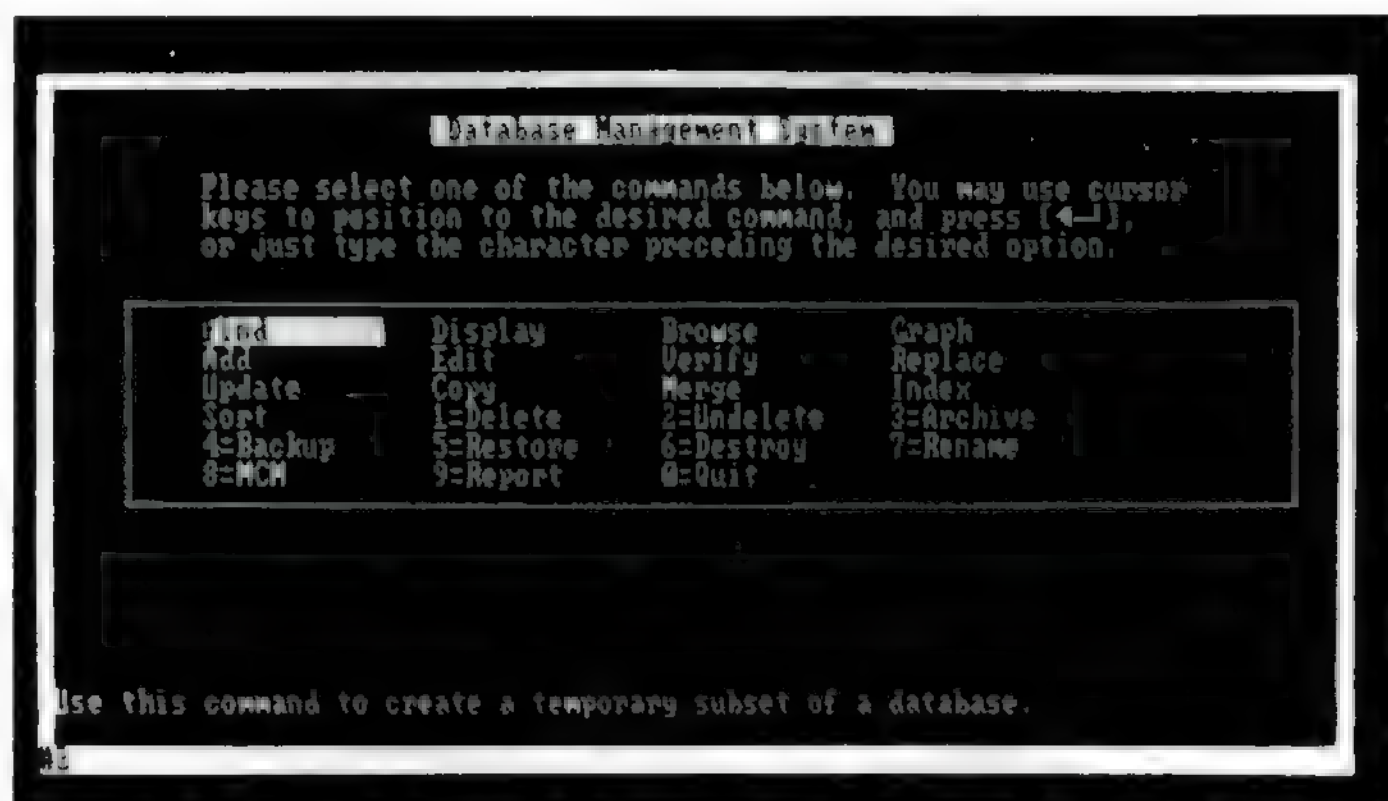


Figure 5: The opening menu of the Database module.

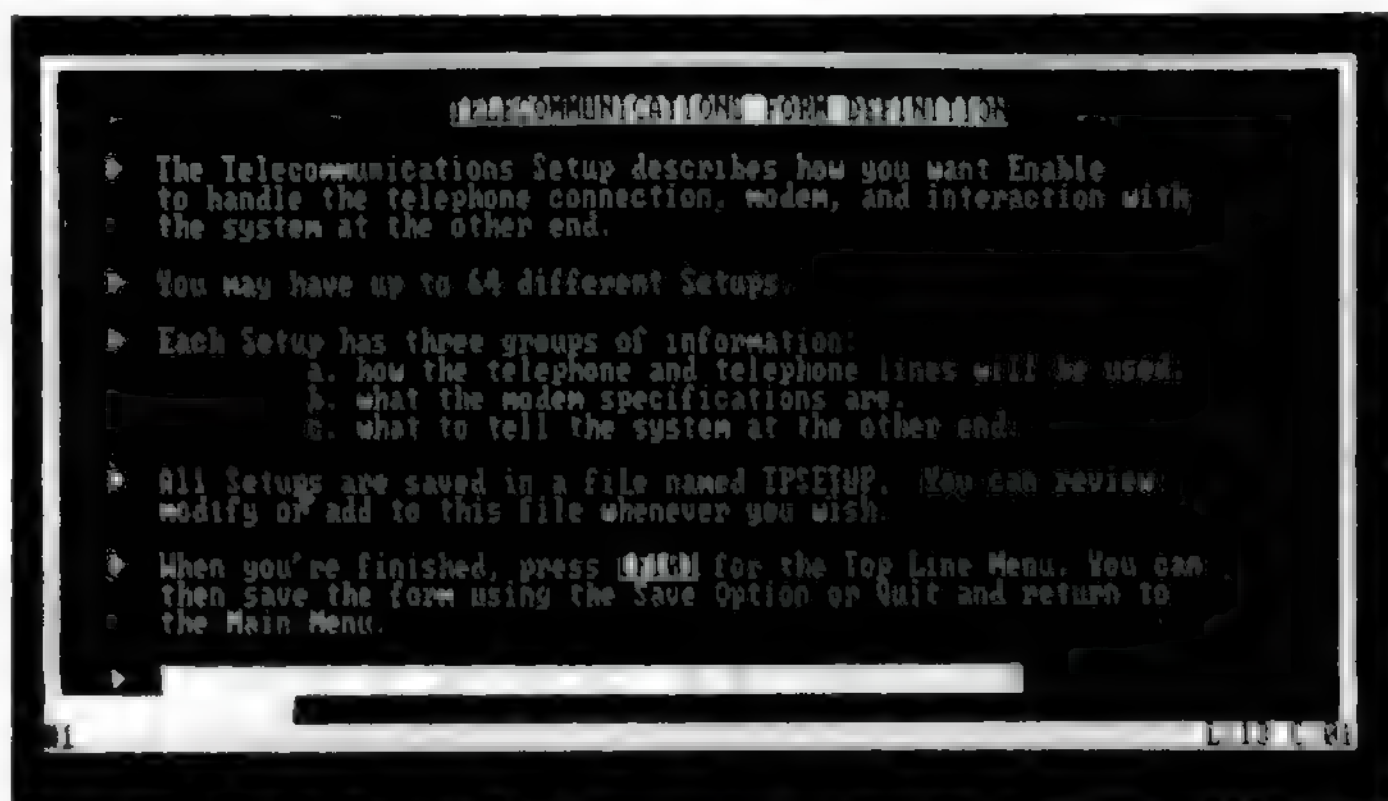


Figure 6: The opening menu of the Telecommunications module.

databases are often the weakest link in other integrated packages, right? Wrong. *Enable's* DBMS is a powerful, flexible system that can handle up to 130 megabytes of information.

The opening menu (see Figure 5) displays the basic functions needed for creating, maintaining, and using a database. During the process of database and report definition, only the database window can be open.

The DBMS module allows you to define each field in a database by prompting you with questions about the data to be entered (text or numeric, for example). Many questions are answered with a single

keystroke. Each record can contain up to 32 fields, or up to 113 derived fields or fields input from another database within *Enable*. Each record, however, is limited to 2,000 characters.

Once you have defined a database, you then can design the data input form. The simple process involves using the arrow key to position the cursor where you want the field to show. *Enable's* manual refers to this command as the "put it here" command. This title is perfectly appropriate, and it turns the designing of forms into the visual process it was always meant to be.

Once you've established a database and

printed the records, you have the option to display, sort, or print them by entering field names and a logical relationship. Mathematical operators (records where the field "city"=Miami, for example) or Boolean operators such as "and" and "or" may be used.

Enable's DBMS has a powerful report-writing capability. As in the input form design, you can design the report form with the "put it here" command followed by the name of the field to be printed in that location. You can use a report language that includes such commands as ".if" and ".else" to create more detailed reports.

The same graphics options available with the spreadsheet can be used with a database. The system prompts you to choose which data fields you want graphed. It's as easy as, well, 1-2-3!


Telecommunications

The telecommunications module works fine. It easily downloaded stock quotations from CompuServe. The telecommunications parameters are easy to enter, and you only have to define the steps for a call and log-in once. You can store up to 64 different "set-ups" (see Figure 6).

The program is extremely straightforward to operate—you just follow a series of prompts. The documentation includes general information on telecommunications so that new users should have little difficulty with the program.

Summary

The Software Group clearly has a winner on its hands. *Enable* must be considered second-generation because it is more evolved, slicker (seamless, some would say), and faster than anything else on the market. Users of other products need not abandon camp, but *Enable* undoubtedly will affect the future sales of its competition. And yes, you guessed it: a multi-user, multi-tasking version of *Enable* should appear soon, along with a version that will run under XENIX and other operating systems. ■



**LURKING
BEHIND EVERY
COMPUTER
IS THE POWER
TO DESTROY
ITSELF.**

That power cord may look innocent. But it could suddenly turn against your PC.

It could, for example, hurl a power spike from static or lightning into its delicate circuitry. Wiping out its memory. Or destroying a defenseless component.

Don't risk it. Get a 6-outlet Wire Tree Plus™ surge protector from NETWORX™. It guards against spikes. Filters out RF interference. And it's the only device with two phone jacks to protect modems against surges.

Other unique features include separate switches for the CPU and peripherals and a bracket that

mounts under the front of the workstation.

The illuminated switches are easy to reach, and yet recessed, so you can't accidentally shut down power and lose data.

If you don't need 6 outlets, pick up our 4-outlet Wire Tree™. Or our single-outlet Wire Cube™ that's ideal for portable computers.

That'll take care of power surges. But what if your foot gets tangled in a power cord? Prevent this potential disaster with the Wire Away™. It stores up to four 18-gauge wires and ends the hazardous mess of dangling cords.

All our products are backed by a 5-year warranty. So when you shop for a PC, ask for NETWORX computer station accessories. And don't go home without them.



NETWORX™
Computer Station Accessories

Special-effects master Robert Hollander and others use the PC and AT to create futuristic graphics for 2010 and other films.

A starship zooms past a distant sun. A 12-foot salamander marches ponderously across a desert in space. A three-dimensional head revolves on a 360-degree axis. In the vast realms of the science fiction film, a great deal, if not most, of the filmmaker's emphasis is on special effects, or SFX—the camera tricks that help the audience suspend disbelief and enter the fantasy world onscreen.

Most of these effects are produced with highly sophisticated, and highly expensive, mainframe computer systems. However, two innovative experts in special effects have now developed PC-based systems that create sophisticated graphics and motion-control effects for the silver screen.

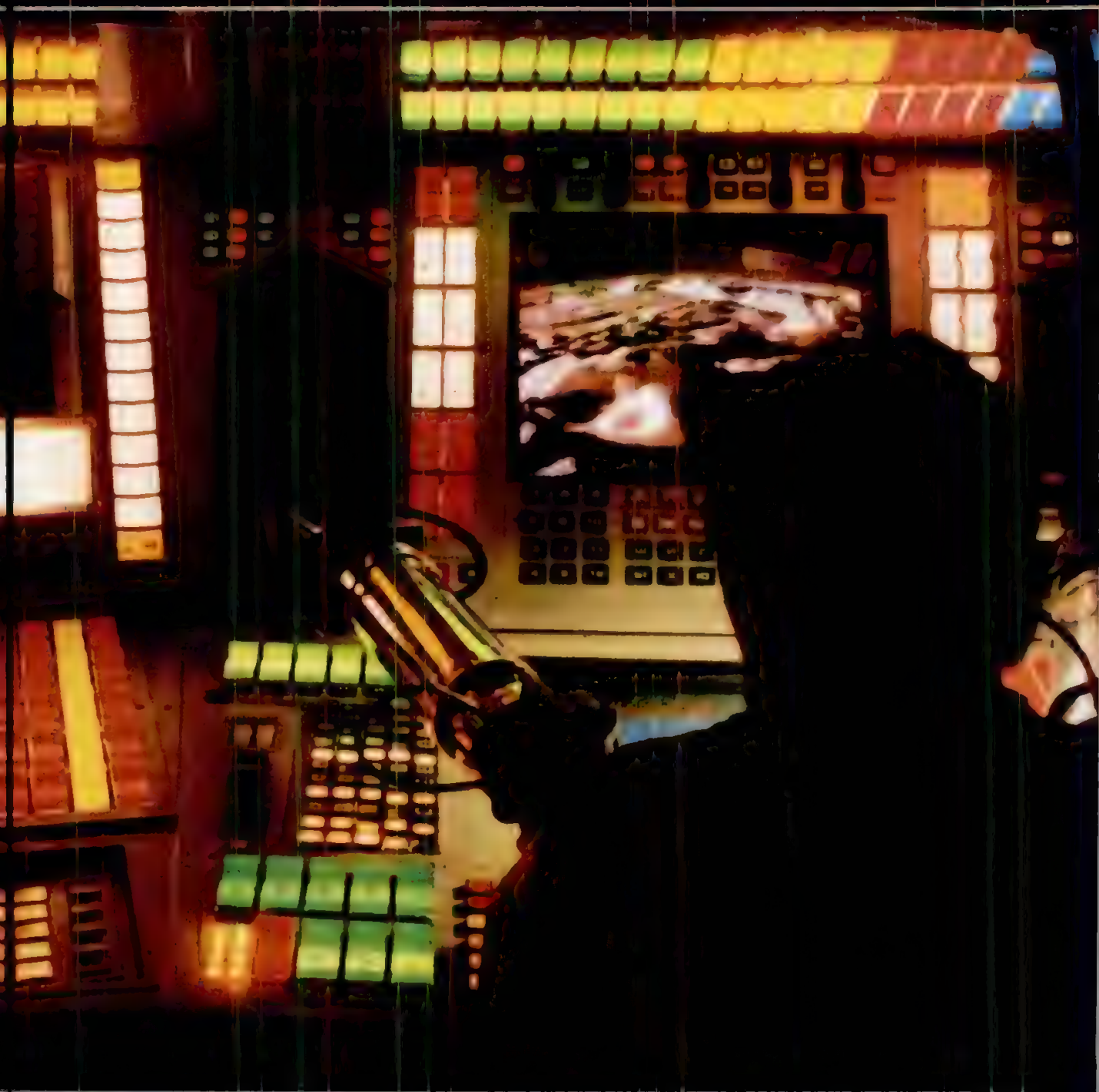
Futuristic Graphics

In *2010*, the sequel to the classic science fiction film *2001: A Space Odyssey*, graphics experts produced background effects using a very down-to-earth IBM PC system.

In *2010*, U.S. and Soviet astronauts are sent to investigate the fate of the



2010: A PC



ODYSSEY

ship lost in 2001. A multitude of on-board monitors flicker with animated computer graphics that depict segmented spaceships, mysterious black slabs, and human heads being examined (presumably) by the ship's scanners. These computer graphics are the creations of Video Image, a small, Los Angeles-based special-effects company. And, according to one of the general partners, Richard E. Hollander, 35 percent of them were created with a PC.

"Lots of people ask, 'Why did you choose a PC?'" muses Hollander in his Marina del Rey studio. "'Why didn't you use a VAX?'" The obvious reason was money, and the fact was we didn't have to have high-resolution graphics for this production. With the volume of production and the type of contract we were getting into, I felt we needed two machines in case one broke. The PC fit the bill."

Hollander, who has a degree in electrical engineering and computer programming from Berkeley, had worked on such movies as *The China Syndrome* and *Star Trek—The Motion Picture*. When the bidding for the video effects for MGM's new film came up, he formed Video Image to try for the job. The new company included John C. Walsh, whose background is in art, along with Gregory L. McMurry and Rhonda C. Gunner, both video editing and electronics specialists.

"We probably got the contract because we were able to provide all the art direction and the technical support as a single company," Hollander says. "The way it worked was that the director, Peter Hyams, first talked to Gregory, who gave the information to John and myself. We created the imagery back at the office, and Greg and Rhonda went on the set to play back the imagery we had created. That kind of vertical integration in a project, especially one like *2010*, makes it go really smoothly for the director." He smiles. "It makes it nice for us, too."

Video Image uses two identical PC-based systems consisting of an IBM PC (one with a 10-megabyte and one with a 15-megabyte Davong hard disk), a float-

ing-point math processor, a Cubicomp CS-5 Solid Modeling System, a backup PC unit with a 15-megabyte hard disk, a GPCO 20-inch by 20-inch digitizing tablet, and a 19-inch monitor.



In the motion picture *2010*, graphics experts produced background effects using a very down-to-earth PC system.

Originally, Hollander used a Cromemco System 2 CP/M computer system for the less-sophisticated graphics production

on *2010*. But he found that the CP/M computer had distinct limitations.

"I felt that the PCs gave me a lot more power than I would have had with the Cromemco. And the Cubicomp gave me a base of 3-D image creation. The day I got it, I started digitizing some models into the system. That's a lot of work.

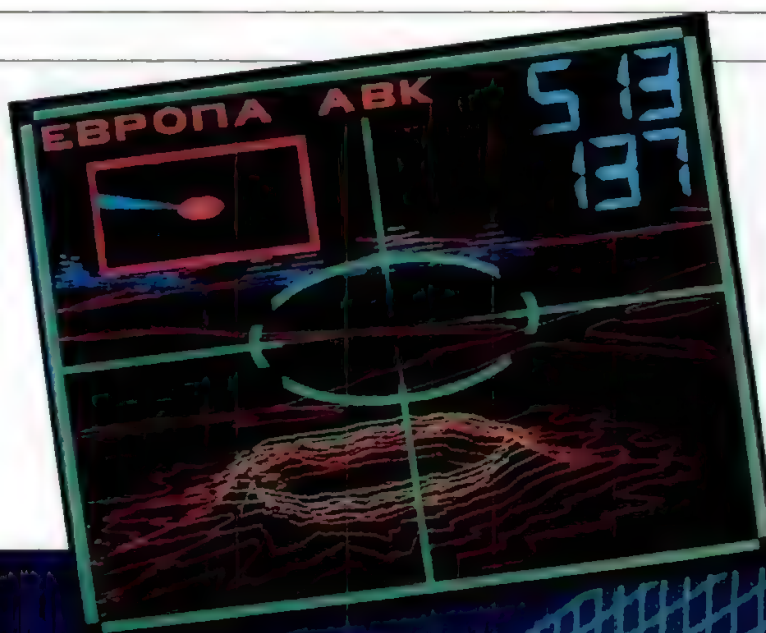
"When I bought the Cubicomp, I was not looking for only a piece of hardware. I was looking for a piece of hardware combined with a piece of software. Software costs much more than hardware, especially in the area of 3-D graphics, and if you don't have decent software, you can't do anything when you get a new piece of hardware. It's an old rule for mainframes, and it holds just as well for PCs."

Video Image's PC systems use three basic pieces of software. The first two are Cubicomp's CS-5 Solid Modeling System and Time Arts's Easel. But these two alone didn't fill the studio's needs.

"We needed to move objects around in



Examples of animated graphics from background monitors in the movie *2010*.
Right: A simulation of the surface of the moon Europa. *Below:* An analysis of the monolith on Jupiter.
Left: The Europa probe.



МОНОЛИТ

A Head for Digitizing

Video Image's Richard Hollander offers some insight into the detail work of filmdom's SFX artists.

The graphics Video Image created for 2010 were not quite as simple to produce as a pie chart or a bar graph. While the PC/Cubicom system can work up some highly sophisticated graphics, producing the type of image suitable for the movie screen required a little imagination.

In one animated sequence, for example, a three-dimensional human head turns on the screen as the computer scans it. To get the proportions on screen, Richard Hollander digitized a styrofoam model of a head into the PC.

Unfortunately, though the head was in the appropriate three dimensions, Video Image's digitizing tablet worked only in two. "We could have sliced up the head," explained Hollander. "Then, on the tablet we would have traced out the perimeter of each of the slices."

But they actually mounted the head sideways on a piece of wood (since the head was symmetrical, they digitized

only half of it) and put it on a milling machine.

Video Image replaced the machine's biting tool with a needle so they could point the machine to various parts of the head. Meanwhile, staff member Peggy Weil drew triangles on the head surface, concentrating on areas that would well define the head and give detail around the more difficult regions, such as the eyes. She numbered each triangle and intersection.

Once they mounted the head on the milling machine, Weil moved the head around. As the needle pointed at each vertex, she checked the coordinates of that point's height, width, and depth as they appeared on the machine's dials (to about a thousandth of an inch) and called them off to staffer Steve Eagle.

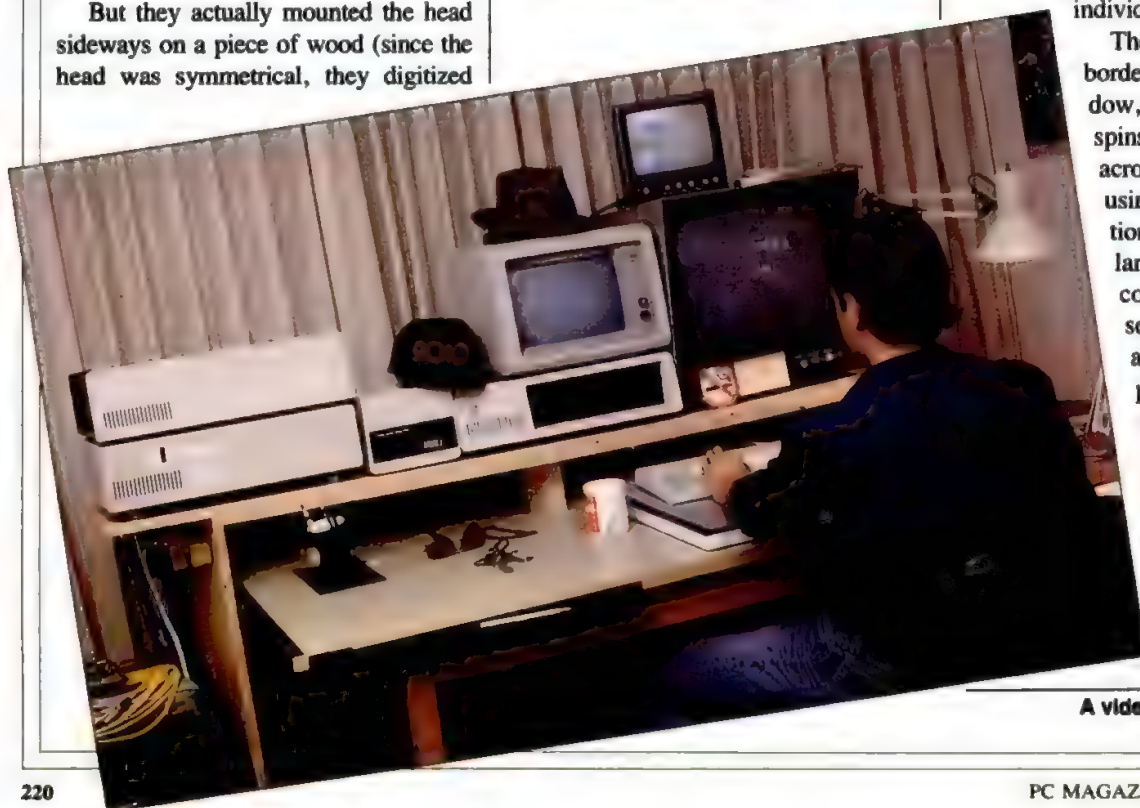
Hollander then wrote

three programs to accommodate the new data: one input the coordinates into a database, another defined the various polygons, and a third input the list of vertices and the list of polygon definitions into a Cubicom database. "The numbers as read were in inches," Hollander recalled, "and I scaled them out to something that was more appropriate for the number system in the Cubicom." He laughed. "There was some error in the number input—we ended up with a head that had a lip sticking out a million miles!"

After making the necessary adjustments, they copied the one side, putting it on the other side, to create a full head. But that was only the beginning of that sequence. The staff then had to put the image on the video screen, plan an animation, and write a script describing the individual sequences.

The final sequence has a border and an inner window, while the head slowly spins. "Each polygon across the face fluctuates, using color map animation," explained Hollander. "And all the final commands and all the sequencing of letters and numbers that appear on the screen are done on the animation system. I'd do the 3-D imagery first, film that, rewind the camera, and do the 2-D stuff on the second pass."

— B.K.



A video Image staffer advises that the hat is optional.

space, and to do quite a few other things, and we had to write some support programs to interface to those two packages. We call our support software HAL," Hollander says, grinning (HAL is the name of the computer featured in both *2001* and *2010*). Hollander wrote HAL using Lattice C. Along with the improved facilities came a few frustrations, Hollander explained. "At that time, HAL didn't support the full address space of the processor, which was a severe nuisance, but using an overlay linker called pLink helped us get around part of that problem. Then Lattice C came out with full point conversion, and we suffered again because the floating-point processor software that we had did not do everything we needed.

"You can't do computer graphics without a floating-point accelerator," Hollander said. He then paused for a moment before correcting himself. "I should say, you can do anything you want—it just takes a long time."

Hollander's software, a modular overlay, which is structured to line up applications programs as they become necessary, forms the basis of many of the company's animation tools.

"We use a 3-D animation system to give coordinates for axes of movement. Our paint program, which has color map manipulation animation capabilities, is very important too. We also use a typesetting program. And we have programs that smooth out curves, an object interpolator that changes the shapes of objects as well as squeezing, rotating, and distorting them. . . . It never ends. The program grows every time we do a project because there's just so many different things you can do with computer animation."

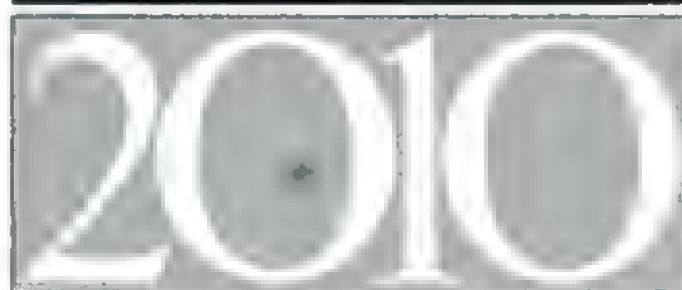
Artistic Freedom

The Video Image crew had a lot of artistic freedom over what they could create for *2010's* video monitor sequences. "There was feedback between John Walsh and director Peter Hyams all the time," says Hollander. "We would make

a Polaroid off the screen and attach it to the sheet showing the animation sequence. Then John would take that in to Peter, and talk, and Peter would say yes or no.

"Sometimes Peter wouldn't see an image until the day it appeared on the set. That's when Rhonda and Greg would save the day—if something wasn't exactly what Peter wanted, and if it could be manipulated with an effects generator or by editing, they would step in and take care of it."

Once the video animation had been completed, it went through an elaborate



At the time of the revolutionary film *Star Wars*, computers became an integral part of the motion-control process.

sequence of filming and refilming to suit the footage to the motion picture camera. As Hollander explains, "Everything always went from the video tube to film, back to video tape, back to the monitor, and then it finally got shot with the camera. Greg made his own box that takes the sync information from the camera and jams the video equipment so that it plays back at the appropriate frequency and the appropriate phase. This rids the film of any of the artifacts (irregularities) that are typically found if you don't synchronize frequencies."

Now that *2010* is a reality, the Video Image crew is using its PCs for other projects, including a 20th Century Fox

film called *Bio Hazard*. Hollander is thinking hard about using the PC AT, but even that will not satisfy his need for fast, sophisticated graphics.

"The AT is a whole new ball game," he says. "And I imagine in another 2 years there will be something to quadruple the capability of the AT." He smiled. "That'll be nice."

Moving Along

"I've done what a lot of computer entrepreneurs have done," explains Bill Tondreau, "which is to capitalize on some previous occupational knowledge. In my case, it was how computers worked."

Tondreau is a photographer who has spent the last few years developing computerized motion-control devices—machines that, by moving a camera around an object, make it appear as if the object is moving instead. Most recently, he has created a PC-based system that produces highly detailed photographic effects.

Until recently, motion control was effected with hand-operated camera stands that would vary the camera's tilt, up-and-down movements, and side-to-side movements. However, these hand-operated stands put severe limitations on technique; in fact, if computers had not come into the picture, most of today's special effects would not be possible. "It's doubtful that 1 take out of 20 would have turned out properly," Bill says. "Every act would have had to have been in exactly the right place at the right time."

Around the time of the revolutionary film *Star Wars*, computers became an integral part of the motion-control process. By using computer-driven machinery to move the film camera, small, elaborate models could be photographed in a way that make them seem extraordinarily realistic. These systems were, of course, extremely expensive, and Tondreau was soon experimenting with much smaller computers that used the Z80 microprocessor.

"Most older motion-control systems use stepper motors," he explains, "which have a resolution of 400 discrete positions

for each turn of the motor shaft. But partly because of the limitations of the Z80 CPUs, and partly because of the limitations of the stepper motor drives, a great deal of noise was generated, the resolution was a little coarse, and the velocities you could reach were rather low.

"Normally, when filming a live action scene you shoot at 24 frames per second while controlling about 12 different motors. In the days of *Star Wars* and some of the older special-effects features that put motion control on the map, shooting at 1 or 2 frames per second was sufficient. But now it's becoming more desirable to incorporate motion-control-type effects with live action. This means you've got to run through these moves really fast, really accurately, with motor velocities that are faster than before.

"But whereas the old Z80s were just about at their absolute limit at 24 frames per second, the IBM PC is just loping along at that rate. Whether because of architectural characteristics in the circuitry or the way the interrupt controller can be reconfigured, you can run through moves at several hundred frames per second. So the PC has taken motion control from running on the ragged edge to doing everything you always wanted easily.

"Also the Z80 chip with its 64K just can't hold the move data. If you're making, say, a minute-long move using 12 motors, you'd have to maintain long lists of numbers of positions in computer memory. The 64K of the Z80 is pretty spare in that respect. But with the 512K on the PC and the 3 megabytes or so on the new AT, you are no longer limited in sophistication of the program or the length of move you can store."

Better Effects with the AT

In fact, Tondreau has already abandoned the PC for the AT. "It's a little more expensive than the PC, but in the world of commercial and film effects, it's false economy not to go for the best," he says. "The PC is totally acceptable, but the AT is significantly faster."

To adapt the AT for motion control, Tondreau devised his own proprietary memory board that contains chips that control six individual motors. Since the AT can hold five of the boards, the computer can control 30 separate axes of motion simultaneously.

Tondreau wrote a program in C and assembly language to accompany his hardware and help the computer direct and keep track of the motion-control equip-



"The AT is a little more expensive, than the PC, but in the world of commercial and film effects, it's really false economy not to go for the best."

ment. "It's a C86 compiler," he explains, "and we're using the math chip, which makes the thing run incredibly fast."

The fully equipped microcomputer can guide a user through the elaborate and exacting movements of motion control. "Suppose I'm working on a simple back-and-forth movement," Tondreau says. "At frame 1, I want the camera to be negative 40 inches from the object, at frame 50 I want the camera 20 inches from the object, and at frame 100 I want it 0 inches from the object. I type in these three positions. The computer then uses a splining algorithm to do a complete frame count." In other words, once the operator has given the AT the most important points to which the camera is supposed to travel, the

program fills in all the intermediate directions.

You can also direct the computer by manipulating the camera physically. Plugging a specially rigged camera stand into the AT enables the operator to tell the computer to capture, remember, and repeat each movement that's made. You also have a choice of outputs—either by following the actual movements of the camera (Tondreau uses a video camera mounted on the motion-control apparatus so that he can watch each movement as it occurs) or through a simple graphics playback on the PC monitor.

Repeatability Factor

The "repeatability" factor may be the PC's most important contribution to motion control. Tom Barron, a master effects cameraman who works with Robert Abel and Associates, a commercial production house, asserts that "the idea of repeatability, and the idea that Tondreau's machine is able to repeat with a very high degree of accuracy, is our primary concern. Once we know and can trust a system's repeatability, we can press for speed, number of channels, ease of operation, good looks, low power requirements, less cables to trip over, all those other things. But if it didn't repeat, it would be practically worthless."

Barron cites an example in which his staff had to shoot a time-lapse show of a cake rising. "We wanted to do a camera move while we were doing the time lapse photography. So we set up Bill's system with a mechanical rig that moved the camera, and he wrote a program that turned on the camera and took an exposure, based on one of the channels of movement. We actually did an ease-out of real time versus cake-baking time, so that the camera took fewer exposures at the beginning when the cake was cold and not rising, and more exposures at the end where the cake was active and browning. So when you look at the sequence, you get a linear sense of the cake rising, and it looks just wonderful. But, in fact, those exposures were spread

Total **Telecommunications™**

4 Products in One Package

Modem



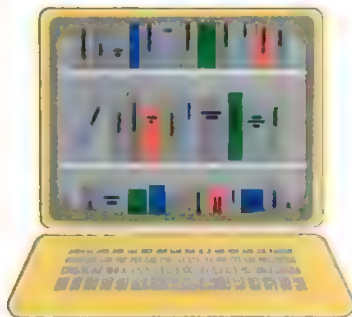
- 300 baud
auto dial-auto
answer modem

ASCII PRO-EZ™ Software



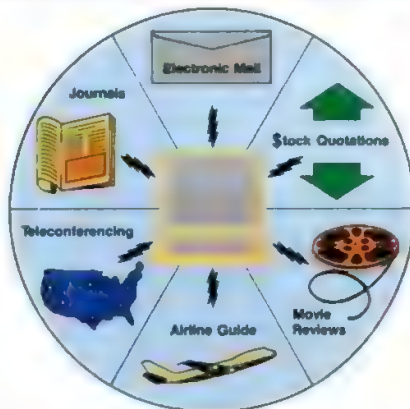
- Advanced telecommunications software
- Sends, receives and stores information
- Easy-to-use
- Automates connections and log-on sequences

Electronic Library



- 8,000,000 books in print
- Full encyclopedia
- Harvard Business Review
- Interactive lectures and seminars
- Microcomputer software directory

THE INFO CENTER™



- Electronic Mail
- Official Airline Guide
- Catalog Shopping
- Movie Reviews
- UPI world news and sports
- Stock quotations
- Journals and magazines in all career arenas
- Teleconferencing
- And much more!

Available at a computer store near you. Or call for more information:

800-22LEARN or 800-44LEARN in California

For Apple® II, II+, IIc, IIe, IBM-PC® and PCjr™

Total Telecommunications and The Info Center are trademarks of TeleLearning Systems, Inc. ASCII PRO-EZ is a trademark of United Software Industries, Inc. Apple and IBM are registered trademarks of Apple Computer Inc. and International Business Machines, respectively.

TOTAL TELECOMMUNICATIONS

TeleLearning Systems, Inc.

505 Beach Street

San Francisco, California 94133

415/928-2800

CIRCLE 387 ON READER SERVICE CARD

FILE TRANSFER + Conversion Utilities

APPLE	IBM PC/XT, JR.	\$129.95
TRS	Tandy 1000, 1200, 2000 ..	\$129.95
CP/M	IBM AT	\$224.95



Transfer your **Apple, TRS, CP/M** to the **IBM PC or Compatibles**.

Transfers: (no more retyping)

- Visicalc, Multiplan
- Basic, Fortran, Cobol
- ASCII files, data files
- Word processing files

IBM PC/XT, Jr. ↔ Tandy 2000 \$129.95
DISK Transporter transfers files back and forth, includes utilities.

New Yellow Disks
DS/DD \$2 ea. (20 min.)

New Products for **IBM AT**
or compatibles
Drives, 360 KB \$275.00
Prototype Boards & Extender
Cards \$120.00 ea.
Serial Cables (6ft.) \$85

■ **PERSONAL**
■ **COMPUTER**
■ **PRODUCTS**



1400 COLEMAN AVE., SUITE C-18 SANTA CLARA, CA 95050
TELEPHONE (408) 988-0164 PHONE ORDERS

IBM, TRS 80 & TANDY, APPLE, CP/M VISICALC, MULTIPLAN ARE RESPECTIVELY REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES CORP., TANDY CORPORATION APPLE COMPUTER INC. DIGITAL RESEARCH, INC., VISICORP, MICROSOFT CORP

CIRCLE 527 ON READER SERVICE CARD

BACKUP PROTECTED SOFTWARE WITH COPY II PC™ 2.0

COPY II PC is the backup insurance you need to protect your software investment. Voted as one of the most popular programs in PC World, **COPY II PC** makes a floppy backup of most protected software quickly and easily.

RUN PROTECTED SOFTWARE FROM YOUR HARD DISK

No longer will you have to insert your original floppy. **COPY II PC** makes using your hard disk as convenient as it should be. Works with the most popular business software. Call for current list.

Minimum Requirements: IBM PC, XT, or Compaq, 64K Memory, PC DOS (any version), One Disk Drive.

Available at your local dealer or direct from us.
Current owners may update for \$22.95 with the return of your original disk.

CENTRAL POINT
Software, Inc.

ONLY
\$39.95

(Plus \$3 Shipping & Handling)

9700 S.W. Capitol Hwy., #100/Portland, OR 97219

(503) 244-5782 **WELCOME**

(Prepayment Required)

Backup Utilities Also Available for:
APPLE II, MACINTOSH, and COMMODORE 64

This product is provided for the purpose of enabling you to make archival copies only

CIRCLE 152 ON READER SERVICE CARD

2010

over time in a very unique way. In most cases, you use the camera shutter speed as the channel around which everything else is synchronized. In this case, we used the cake."

And Barron agrees with Richard Hollander's estimation of the economic advantages of the PC. "We basically work under battlefield conditions," he explains. "We're always running machines to the limit, and so we need to have a good,



"We basically work under battlefield conditions. We're always running machines to the limit, so we need good equipment like the PC."

dependable piece of equipment like the PC upon which to base the system. Quality hardware has always been one of our most important needs."

Meanwhile, Tondreau's entrepreneurial efforts has successfully established him as a one-man production company, developing and assembling motion-control systems for production companies like the one Barron works with as well as for most of the major film studios. He recently sold his new AT system to Industrial Light and Magic, the special-effects house established by George Lucas, producer and director of *Star Wars*.

"I'm absolutely using only the PC," Tondreau declares. "It's such a good, advantageous basis for my work." ■

PC MAGAZINE • FEBRUARY 19, 1985

**Engineering
Excellence**

CROSSTALK™
XVI



**THE STATE OF THE ART IN
DATA COMMUNICATIONS
SOFTWARE**

DESIGNED BY

MICROSTUF®

CROSSTALK IS A TRADEMARK OF
MICROSTUF, INC., ATLANTA, GEORGIA

CROSSTALK IS AVAILABLE FOR
MOST SMALL BUSINESS
COMPUTERS

DATE

2/16/84

CIRCLE 326 ON READER SERVICE CARD

Copyright © 1984

A Microcomputer

It's all here—micro trivia, famous names, obscure book titles.

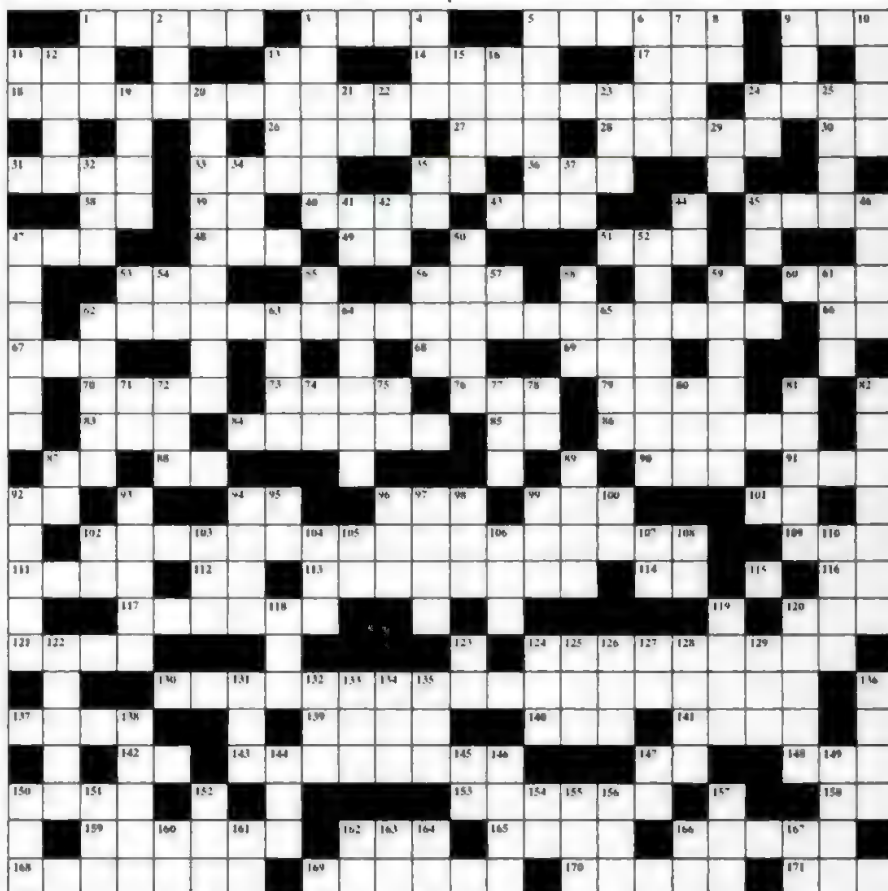
ACROSS

1. A widely used code representing alphanumeric characters. (Hint: If you're given an "e" for effort at doing this puzzle, your computer will have to give a "1000101.")
3. Bits per second, approximately.
5. Artificial intelligence pioneer Alan.
9. Hollywood computer.
11. *WordStar* command to move cursor to previous position after saving text.
13. "Eliza" is an example of this field.
14. Assert.
17. Kind of switch. Also, synonym in certain parts of the country for *nerd*.
18. Host Ed, actor Paul, and Bishop.
24. Epson printer.
26. ——— General (*Soul of a New Machine* locale).
27. Display used on keyboards and printers.
28. What hard-core hackers (disparagingly) and documentation writers (impersonally) call the rest of us computer owners.
30. ——— cit.
31. BASIC statements that serve to clarify information for humans, but that the computer couldn't care less about.
33. Spell ———.
35. "——— Shall Overcome."
36. Paddle.
38. Silicon Valley firm famed for its scientific computers.
39. Initials of science fiction author who writes a book a month on his TRS-80 and who was the first to suggest that the first law for robots is never to harm a human.
40. Ivy League university with leading artificial intelligence program.
43. What to see in your Chevrolet.
45. Apple microprocessor.
47. Garage mechanic turned guru, now rumored to be turning to politics (nickname).
48. Main chip.
49. The U.S. institution that's slower than Source Mail (abbr.).
51. Flat-screen display technology.
53. ALGOL's original name.
56. Eight of these make a byte.
60. Another name for the Starwriter of Printmaster letter-quality printer distributed by Leading Edge.
62. Solitary song of an oxlike African antelope with a nasty disposition.
66. The two numbers a computer knows.
67. Atari chief scientist (formerly top honcho at Xerox PARC).
68. CompuServe menu command.
69. Leo Durocher's nickname.
70. Send data into storage.
73. BASIC command, or something to take with

you to the CompuStore.

76. "If I ——— a hammer . . ."
79. \$10,000 Apple and/or object of custody suit.
83. Weird.
84. "An offer you can't ———."
85. Magazine catering to IBM owners.
86. Computerease for *loser*.
87. Initials of software firm that sells *WordStar*.
88. ——— !Solver.
90. Proofreaders' dashes.
91. How you feel when your system crashes.
92. Initials of the man who invented Microsoft BASIC.
94. Marketing field.
96. Trendy.
99. Pac- ———.
101. Lobster land (abbr.).

102. Naked serviceman's foot bottom.
109. *The ——— of Physics*.
111. Common bus (computer variety).
112. Trnspt'n.
113. Branch of computer science that's turning out factory workers.
114. *King of Comedy* actor (initials).
115. Average computer language.
116. Loyola University letters.
117. Seymour Papert's favorite animal.
120. Asian holiday.
121. Kind of semiconductor technology, often used in portables.
124. New catchword used to describe hardware or furniture designed with the human-machine interface in mind.
130. Levi's belonging to earthling who does not have sex.
137. What Bette Davis would call a computer



The solution can be found on page 307.

Crossword

Give it a try, but don't let the numbers fool you.

- screen printout.
 139. Goddess.
 140. Ref.
 141. Otherwise retrograde film that was the first to use computer graphics.
 142. Former.
 143. An absurd set of rules governing diplomatic relations. In addition, an equally arcane set of rules governing the formats of messages to be exchanged by computers and peripherals.
 147. Letter addendum.
 148. "_____ the season to be jolly."
 150. Beta _____ site.
 153. The portable computer that's giving Adam Osborne some sleepless nights.
 158. Region of the United States where famous Route 128 is located (abbr.).
 159. Kind of access.
 162. Apple product.
 165. Greek letter. Also, what you don't care one of if you never touch a typewriter again.
 166. IBM PC operating system.
 168. Algebraic notation system. (Also, adjective referring to college cheers emanating from 40 across.)
 169. Author who's taken some kidding in this puzzle.
 170. 400 or 800.
 171. Telecommunications command.

DOWN

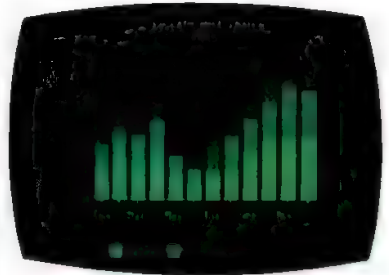
1. A programming language with a truly hum name.
2. Acronym for the use of computers in classroom teaching.
3. Having only two possible states.
4. Beaver construction.
5. Radio Shack operating system.
6. Fifteenth.
7. Screen size in inches of 153 across.
8. Family doctor.
9. Numbering system having a base of 16 (abbr.). Also, what you might like to put on certain software designers.
10. Closed sequence of instructions in BASIC, especially in Chicago.
11. Keyboard instruction on many computers to freeze scrolling text.
12. Sprint printer manufacturer.
13. A wing _____ prayer.
15. Sunny _____, in Silicon Valley.
16. Wind direction, if the wind is blowing from Radio Shack corporate headquarters to Wang Laboratories, Inc.
19. Artificial intelligence language or actual speech defect.
20. Calcalike.

21. The Extraterrestrial.
22. Home state of Microsoft (abbr.).
23. Continent (abbr.).
24. Salutation for a fem.
25. Intel 8-bit chip.
29. The microstate (abbr.).
32. Measurement in millions of cycles per second.
34. Astaire's forte.
35. Us festival-goers?
37. Organization of problem drinkers.
41. Wire service on CompuServe.
42. _____ and behold!
44. 8 down, for instance.
45. Fairly standard computer memory configuration, in K.
46. Movie starring 9 across.
47. *Star Wars* denizen.
50. ProWriter printer manufacturer.
52. To prepare a machine-language program from a program written in a high-level language.
53. Input/output.
54. Capone.
55. Home of Carnegie-Mellon (abbr.).
56. Mistake in a program.
57. Ordinal suffix.
58. Transistor-transistor logic.
59. Health foods (nonhacker fare).
61. Bell _____ modem protocol.
62. CompuServe on-line helper.
63. Related data on a disk, or something to put in a jailhouse cake.
64. Another BASIC command.
65. Dress-for-success tie or blouse material.
71. Commercial.
72. Monitor.
74. _____-THEN-ELSE.
75. Eliot. Or what to say when someone tells you it's their turn at the arcade.
77. Throwback character in 46 down.
78. Capitol city initials.
80. Total.
81. The key on the Apple that people constantly press by mistake, which causes them to lose all their data.
82. Silicon Valley hardware executive Bill.
87. Sports car, or initials of Morrow exec.
89. Red planet.
92. Programming language invented at Dartmouth and transported to micros on the MIT's Altair.
93. Starts the computer.
94. Serial, parallel, or girl in every.
95. _____ modulator. Also, initials of one of the creators of *VisiCalc*.
96. Nickname for Boston. Also, the ring at the center of a floppy disk.
97. False god.
98. Cuddly, fuzzy, Commodore computer.
99. Big _____.
100. "Neither" in Nice.
102. Therefore.
103. Computer operator goof (abbr.).
104. _____ you kidding?
105. Negative.
106. Leading technological university.
107. Home state of Stevens Institute of Technology (abbr.).
108. Overhead train.
110. Actor Guinness.
118. Lines per inch.
119. Creature who runs amok in the computer game *Pig Pen*.
120. Opposite of 148 across.
122. Device that allows middle-aged male executives who never learned to type to be part of the computer age.
123. Home state of CompuServe (abbr.).
124. Ostrichlike Australian bird.
125. Available memory.
126. Gross national product.
127. Football's Simpson.
128. Multiuser computer setups.
129. J, k, l, _____.
131. Where you can put a detachable keyboard if you're so inclined.
132. _____ degradable.
133. Firm that makes add-on boards for the IBM PC.
134. What Clive Sinclair is probably called in Spain.
135. The computer's panic button.
136. D _____ II.
138. Part of a daisy wheel?
144. Permanent memory.
145. BASIC prompt.
146. Den (where the pirate or the green snakes lives in *Adventure*).
147. Italian river.
149. _____ many words.
150. Actor Hunter, or column feature.
151. Box office sign.
152. Lady Lovelace (first programmer; also daughter of Lord Byron).
154. _____ ho ho!
155. School org.
156. Quick and dirty version of 122 down?
157. Something that's smaller than VLSI, but bigger than MSI.
160. _____ plus ultra.
161. Binary state.
162. 3.14159265, approximately.
163. Driver's license, for instance.
164. What is the name of TV's famous talking horse.
166. Title of TV's talking horse.
167. Steer.

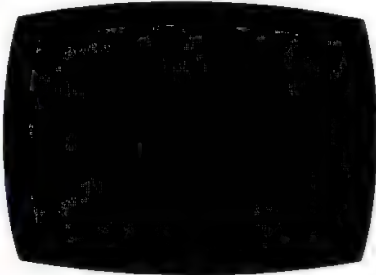
IBM MONOCHROME GRAPHICS. NO COMPROMISE.



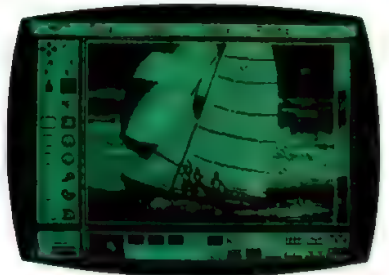
Lotus™ 1-2-3™



Flight Simulator®



Mouse Systems™
PC Paint



IBM PC Tutorial™



The Hercules Graphics Card™ \$499



The IBM® Monochrome Adapter \$250



The Paradise Modular Graphics Card™ \$395

The Paradise Modular Graphics Card is the *only* video card that runs all popular IBM color/graphics software—full-screen—on an IBM (or equivalent) monochrome monitor. *Unmodified.*

Right off the shelf.

And not just ordinary monochrome: Crisp, full-screen, flicker-free monochrome graphics translated in up to 16 shades.

- Includes IBM-compatible color graphics on an RGB or composite video monitor.
- Optional memory (up to 384Kb), clock/calendar or floppy disk controller, and parallel, serial or game ports available.

All in a single PC or XT slot.

This may be the only card you'll ever need.

Call today for more information:

1-800-527-7977, In CA: 1-800-822-2020 (Dept. 133)

150 North Hill Drive, Brisbane, CA 94005, 415-468-6000

PARADISE

You can measure it.

Trademarks: Paradise Modular Graphics Card—Paradise Systems, Inc.; Hercules Graphics Card—Hercules Computer Technology, Inc.; Lotus—Lotus Development Corporation; Mouse Systems, PC Paint—Mouse Systems Corporation. Registered trademarks: IBM, PC Tutorial—International Business Machines Corporation; Flight Simulator—Microsoft Corporation.



LET'S TALK EXPERT-TO-EXPERT

PC TECH JOURNAL, the magazine written for sophisticated IBM PC users...talks with you expert to expert!

Do you require a magazine that provides you with insight and knowledge to act as your silent partner when designing new systems? Have you needed to consult with authorities in telecommunications to resolve a nagging problem? Wouldn't a second opinion about connecting your PC to a main-frame be helpful? With your subscription to PC TECH JOURNAL, you're harnessing experts in your field...experts who will talk to you in the language you understand, about the concerns you have...EXPERT TO EXPERT!

PC TECH JOURNAL is the technologically sophisticated magazine written for experts in the field of personal computing like yourself...discussing the concerns experts have...developing elegant programming methodologies only experts can understand...covering the whole field of IBM PC's with thought-provoking articles on communications, distributed processing, office automation, networking and programming.

Subscribe today and save up to 27% off the full subscription price, and have PC TECH JOURNAL delivered to your home or office every month! From One Expert to Another: *Subscribe Today!*

**TECH
JOURNAL**

PC8Z201

P.O. Box 2966, Boulder, Colorado 80322

YES, I want to communicate with other experts and professionals about IBM PC's and compatible machines! Please enter my subscription to PC TECH JOURNAL for:

☐ 8 issues
for \$17.97—
SAVE 10%!

☐ 12 issues
for \$24.97—
SAVE 17%!

☐ 24 issues
for \$43.97—
SAVE 27%!

Mr./Mrs./Ms. _____ please print name in full

Company _____

Address _____

City _____ State _____ Zip _____

Savings based on full one-year (12 issues) subscription price of \$29.97

Check one: ☐ Payment enclosed. ☐ Bill me later.

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Please add \$1 per issue in Canada and all other foreign countries. Please allow 30 to 60 days for delivery of first issue

**Your computer
is smart ...
Your
workstation
should be, too!**



Compucart is "The Smart Cart!" Smart because it gives you comfort, convenience, mobility and security, all in one compact PC workstation. Compucart is ergonomically engineered to adjust for the user's comfort. It's designed to enclose and secure both hardware and software with one key. And, Compucart's twin-wheel casters let you move the compact Compucart with ease! Now that's a Smart Cart!

- Holds a complete PC system • Adjusts for hardware and user
- Controls cabling and hardware • Rolls easily • Locks securely with one key • Quiets the printer • Very affordable • High quality materials and craftsmanship • Cools computer hardware
- Human-factor engineered (ergonomic design) • GSA scheduled

Products of Versa Tec Corporation • 60 years of craftsmanship

"The Smart Cart!"
COMPU-CART



CIRCLE 199 ON READER SERVICE CARD

CALL TOLL FREE 1-800-237-9024

IN FLORIDA CALL (813) 251-2431 • P.O. Box 2095, Tampa, FL 33601-2095

HOW TO USE COMPUTERS TO TEACH MATH!

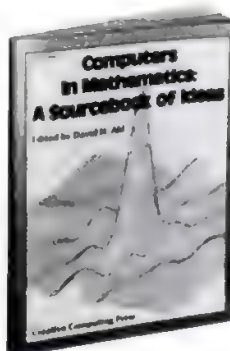
COMPUTERS IN MATHEMATICS:

A SOURCEBOOK OF IDEAS—EDITED BY DAVID H. AHL

Here's a goldmine of learning ideas, problem-solving strategies, programming hints, puzzles, brain teasers and more for the math teacher or student with access to a computer!

This book of reprints from *Creative Computing* magazine covers nine important subject areas

- Computer literacy.
- Thinking strategies and problem solving techniques.
- Computer simulations.
- Probability.
- Mathematical miscellany, from circular functions to differential equations.



- Art and graphics in math.
- Computer Assisted Instruction.
- Programming style.
- Puzzles and problems.

In all, **COMPUTERS IN MATHEMATICS** contains 77 fascinating articles, over 200 problems and nearly 100 programs. This practical volume is an invaluable classroom tool for math teachers and students in Grades 6-12. 8 1/4" x 11", soft-cover, hundreds of illustrations and diagrams.

**USE COUPON TO ORDER
YOUR COPY TODAY**

CREATIVE COMPUTING PRESS Dept FD3H
39 East Hanover Ave., Morris Plains, NJ 07950

Please send me _____ copies of **COMPUTERS IN MATHEMATICS**, at \$15.95, plus \$2 postage and handling,* each. #12D

CHECK ONE:

☐ **PAYMENT ENCLOSED \$** _____ (CA, NJ and NY STATE residents add applicable sales tax.)

☐ **CHARGE MY:** ☐ American Express
☐ MasterCard ☐ Visa

*Outside USA add \$3.00 per order

Card No. _____ Exp. Date _____

Signature _____

Print Name _____

Address _____ Apt. _____

City _____

State _____ Zip _____

For faster service,
CALL TOLL FREE: 800-631-8112.
(In NJ call 201-540-0445)

Oxford (äks'ferd) Goes On-Line

As the editors of the huge and authoritative Oxford English Dictionary put all 17 volumes on-line, IBM is providing funds and PCs for the project.

The venerable though ponderous *Oxford English Dictionary* may be the last word on the English language—but it's certainly not the latest. This scholarly dictionary illustrates the history of the word *computer* with quotations dating from 1897 to 1970. Its most recent entry, however, is from almost 10 years before the microcomputer arrived to take data processing away from the mysterious mainframe and put it right in front of everyone's nose.

Don't blame the scholars at the Oxford University Press for the oversight. Print is, by nature, susceptible to chronic obsolescence; it's simply too expensive to update books for every scientific and technological change. But now, the publishers of the *Oxford English Dictionary* have announced a plan for keeping up with the times: all 17 volumes of the *OED*—as this encyclopedic dictionary is known to its admirers—are going on-line. IBM is financing a big chunk of the project, and, as a result, project managers expect the IBM PC to play a major role in digitizing the *OED*'s definitions.



A Greater Market

Oxford University Press expects to publish an integrated edition of the dictionary in book form at the end of 1987 and to put it on-line in 1988, making this bulky reference work more widely available and more easily accessible than ever before. "People will be able to subscribe to it," says Tim Benbow, manager of the *New Oxford English Dictionary* project at Oxford University

Illustration: Bill Russell

Press in England. "We want to have it on some of the large database hosts, such as The Source or Dialog. But we have other plans in mind, too. In fact, we foresee a

greater market for it as a standalone database on optical disk—as soon as this technology becomes more widespread."

This statement may throw some light

on IBM's interest; widespread speculation has it that Big Blue will release some form of optical storage device for its micros within the next few years. Most rumors have centered on the 4.72-inch-wide compact disk (CD) format as the likely candidate. Benbow says that the complete *NOED* would occupy 1 gigabyte of storage space—equal to one side of a 12-inch laser disk or two of the new audio CDs.

Before any of these plans become possible, the 60 million words in the *OED* and

LePrint™

Letter Quality for your Dot-Matrix Printer

IBM® PC
WordStar®
Edition

Now supports
Epson® LQ-1500™ Printer (and 37 others)

13 Type Styles

5 Standard:

Courier 10
Pica 10
Prestige Elite 12
Times Roman
Times Italic

8 Optional:

Clarendon
Letter Gothic 12
Helvetica
Old English
Park Avenue
Greek Characters
(αβγδεζηθικλμνξ)
Math Symbols
(ω)→2→E→∞→∞→
Special Symbols
(©)→(®)→(™)→(™)→

38 Printers

Apple: DMP
C. Itoh: 8510 Pro/Writer
1550 Pro/Writer II
Epson: LQ-1500
FX-80 FX-100 MX-80
MX-100 RX-80 RX-100
Hewlett-Packard:
HP 2225 ThinkJet
IBM: Graphics
Inforunner:
Riteman 15 Riteman II
Riteman Plus
Riteman Blue Plus
Mannesmann Tally:
Sprint
Mitsuba: Super 5 CP-80
NEC: P2 Pinwriter
P3 Pinwriter
Okidata:
ML-92 ML-93
Pacemarc 2410
Panasonic:
KX-P1090 KX-P1091
KX-P1092 KX-P1093
KX-P1160
Star Micronics:
Delta-10 Delta-15
Gemini-10X Gemini-15X
Radix-10 Radix-15
Tandy/Radio Shack:
DMP-2100
Toshiba:
P1340 P1350 P1351
Additional printers are being
added.

LePrint takes advantage of the graphics capability of your dot-matrix printer to produce high quality characters in a wide variety of type styles and sizes.

LePrint's growing Type Library contains a variety of distinctive fixed pitch and proportionally-spaced type styles. Each type style can be printed in sizes from under 1/12 inch (this size) to over 10 inches high. You can easily print multiple type styles and sizes on a page or even on a single line!

LePrint produces true *proportionally-spaced* and *micro-justified* text whose "typeset" appearance is easy to read and conveys a professional image.

Best of all, this edition of LePrint is designed specifically for use with WordStar. LePrint can print your existing WordStar documents without modification—including embedded print controls and dot commands. If you know WordStar you already know LePrint.

Ask your dealer for a LePrint demonstration and a copy of our *free* 12-page brochure. If you prefer, call us *toll-free* for more information or use your credit card to order direct with our 30-day refund offer.

Only \$149
(includes 5 standard type styles;
additional styles just \$19 each)

Call Toll-Free
800-LEBAUGH

(800-532-2844)
In Nebraska 402-733-7600
Dealer and Distributor inquiries invited

LeBaugh™

LeBaugh Software Corporation
2720 Greene Avenue
Omaha, Nebraska 68111

Copyright © 1984 LeBaugh Software Corporation. All text print-
Epson is a registered trademark of Epson Corporation. LQ-1500 is a trademark
IBM is a registered trademark of International Business Machines Corporation. WordStar is a registered trademark of
erica, Inc.
International

The complete NOED would occupy 1 gigabyte of storage space—equal to one side of a 12- inch laser disc or two of the new audio CDs.

its *Supplements* must be transformed into electronic bleeps. Then the volumes must be integrated and the text edited. This project is immense. It's expected to cost \$10 million—not counting IBM's \$1.4 million donation of hardware, software, and professional expertise. The company has encouraged the *NOED* team to use its full range of hardware.

IBM PCs, for example, may be used to download sections of text onto a Winchester hard disk to let an editor process it locally. Standalone micros will also come in handy, Benbow adds, for the complex administrative tasks involved in keeping track of thousands of pages and millions of words at various stages of processing.

An Ambitious Dictionary

Monumental undertakings of this sort are nothing new for the editors and publishers of the *OED*. The first volume appeared in print on February 1, 1884, and

covered only the words from *A* to *Ant*. The word *computer* made its first appearance in an 1897 entry that described a "certain circular slide rule" invented by Mr. W. Cox. It took the editors 44 years to reach the end of the alphabet, with the publication of the final volume in 1928.

Those weighty 13 volumes survey the words that have made up the English language since the middle of the twelfth century, including all those that dropped out of use along the way. More than 400,000 words are examined in detail, covering 16,570 pages. The use of each word (and each variant definition) is illustrated with literary allusions by date—more than 2 million quotations in all.

The result is a unique historical dictionary that tells you exactly when a word appeared and when its meanings changed. It has become an indispensable resource for scholars, who use it to find out, for instance, all the possible connotations of a Shakespearean soliloquy.

Even more remarkable than the sheer size and ambition of the original *OED* were the indefatigable efforts of its first editor, James Murray. The self-educated son of a Scottish tailor, Murray began his work with a small band of assistants in a shed in his London garden. Although he died in 1915, Murray personally edited nearly half of the definitions in the complete 1928 edition.

An On-line Update

The *OED* is not frozen in 1928. Knowing that a living language continues to grow with new words and usages, the Oxford University Press dedicated itself to combining the traditional and the contemporary in its master lexicon. Supplementary volumes began to appear 12 years ago, recording words that have appeared since the 1920s. The fourth and final supplement will be published in 1985.

Integrating the four *Supplements* into the main body of the text is one of the major goals of the *New Oxford English Dictionary*. The work will be done on an IBM 4341 mainframe (donated by IBM

United Kingdom, Ltd.) along with tape and disk storage units, printers, and more than 20 terminals.

Before the computerized editing can

begin, however, the existing edition must be keyed in. The editors have handed that daunting task to the International Computaprint Corporation in Fort Washington,

Now available!

The all new **SONY Trinitron™** High Resolution Color Monitor

for your IBM PC,
PC/XT, or PC Jr.

\$599

(display stand optional)

Sony's exclusive Trinitron™ color picture tube represents a major advance in the design and performance of color monitors. All other color picture tubes employ systems which have inherent limitations. The SONY Trinitron™ avoids these limitations and provides truly fine resolution (a remarkable 800 x 244).

- High resolution 12" Super Fine Pitch (0.25mm) Trinitron™ picture tube.
- Anti-Glare eye protection screen.
- Plug compatible for IBM PC, PC/XT, and PC Jr.
- RGB Multi Input (digital/analog).
- Automatic Vertical Frequency Switch (50/60 Hz).
- Unique H-Shift for adjusting display position.
- Optional swivel-type display stand.

Order today and get your SMF-503 cable free! (a \$39 value)

Call 1-800-432-2442 outside Illinois / 1-217-384-3040 in Illinois or order by mail:

SONY CPD 1201 **\$599**
Optional SU-531 Stand **59**
Required SMF-503 Cable **39**
Shipping **50**
Illinois residents add 6% sales tax

SGA DATA PRODUCTS
101 East Green Street
Champaign IL 61820

☐ Enclosed is a check or money order for \$ _____ ☐ Charge to ☐ Visa

☐ MasterCard Acct # _____

Expiration Date _____ Signature _____

Name _____ Phone _____

Address _____

City, State, Zip _____

2-A

CIRCLE 372 ON READER SERVICE CARD

Pennsylvania, where 120 keyboard operators are currently pounding out the millions of words that make up the text. The many fonts and symbols used in the dic-

tionary would dumbfound a mechanical character reader, and so the entire input will rely on human, CRT-bound scribes. To make the text accessible to machine

searches, each element of every entry—pronunciation, etymology, definitions, and quotations—are being coded.

"We're trying to ensure that the integration is as automatic as possible," says Benbow, explaining that the process is not as easy as it might seem. Some entries in the *Supplements* are wholly new and need only be inserted between two other words in the main volumes. Other entries in the *Supplements* are lists of auxiliary definitions and subdefinitions.

While much of the *NOED* project is still in the development stage, it is certain that at least three IBM 3290 terminals will assist with the test-integration process. The terminals have a windowing ability that will allow editors to put two documents on the screen next to each other, which will make it easier to combine the texts. With software designed to handle a good deal of the integration automatically, Benbow hopes "editor intervention" will be modest and that three workstations will prove sufficient. PC 3270s may be employed at this stage.

One thing Benbow won't need is pre-programmed software to check spelling. No spelling dictionary currently available in word processing packages knows more words than the *OED*. This preeminence should stand since it won't be difficult to keep the electronic *NOED* both authoritative and up-to-date. The editors will be able to add new words easily and release new editions electronically at regular, timely intervals.

Other On-line Dictionaries

At some point, the dictionary could be put on a single computer chip and built into an ordinary word processor so every writer can have the whole language and its long history at his or her fingertips. In fact, in 5 years, according to one computer expert on the project, the IBM PC will have enough processing power to manipulate this entire database.

Although such American dictionary publishers as Houghton Mifflin and Merriam-Webster have already supplied word

Here are 69 reasons to buy at Elek-Tek, not to mention the fastest delivery anywhere.

PRINTER ACCESSORIES

1. **FR 192**
Epson 80 col ribbon \$ 3.50
2. **FR 193**
Epson 132 col ribbon 5.00
3. **FR 153A**
OKI & Gemini Ribbon 1.50
4. **FF 7353**
80 col printer stand (metal) 15.00
5. **FF 7354**
132 col printer stand (metal) 18.00
6. **CB 5605**
IBM PC to Epson cable, 8 ft 20.00

IBM PRODUCTS

24. **Amdek 310A**
Amber Monitor \$ 160
- Other Amdek Monitors .CALL
25. **AST Six Pak +**
Multifunction Board, 64K 250
26. **AST Megaplus II**
Multifunction Board, 64K 250
27. **AST I/O Plus II**
Multifunction Board, 0K 125
28. **Quadram Quadboard**
Multifunction Board, 0K 210
29. **Quadram Quadboard**
Multifunction Board, 64K 270
30. **Quadcolor I**
Graphic Board 210
31. **Paradee**
Modular Graphics Card 290
32. **Hercules**
Monochrome Card 320
33. **Hercules Color**
Color Graphic Card 170
34. **Novation 4905911**
Modem w/software 320
35. **Novation 4905921**
Internal Modem w/software 320
36. **Hayes 1200B**
Internal modem w/software 399
37. **Anderson-Jacobson 1212-2C01**
Internal modem w/crosstalk 360
38. **Anderson-Jacobson 1212-2C02**
Modem w/crosstalk, 2nd ser. port 400
39. **TEAC FD55B**
1/2 ht. DSDD Disk Drive 129
40. **Switchcraft Keyboard**
13 prog. keys, heavy duty 175
41. **WICO 500110**
Analog Joystick 35

Save 30% to 43%

off Manufacturer Suggested Ret. prices on

EPSON • Okidata • Gemini • NEC
• TOSHIBA • COMREX • TTX

EPSON®

7. RX 80 FT + \$ 275
8. RX 100 375
9. FX 80 + 375
10. FX 100 575
11. LQ 1500 par 1150
12. CR II Comriter 360

star

13. Gemini 10X 235
14. Gemini 15X 365
15. Delta 10 360

OKIDATA

16. Oki 84 CALL
17. Oki 92 CALL
18. Oki 93 CALL



EPSON
FX 80+

OTHER PRINTERS

19. TTX 1014 \$ 360
20. SCM D200 390
21. NEC 3510 1350
22. NEC 3550 1800
23. Toshiba P1351 1190

DISKETTES

Call for Quantity pricing for 10 boxes or more.

maxell

42. **MF1**
3 1/2" SSDD \$ 34
43. **MF2**
3 1/2" DSDD 50
44. **MD1**
5 1/4" SSDD 16.50
45. **MD2**
5 1/4" DSDD 21.50
46. **MD2DD**
5 1/4" DSDD/96 TPI 35
47. **MD2HD**
5 1/4" DSDD/IBM AT 45
48. **FD1**
8" SSDD 32
49. **FD2**
8" DSDD 37
- 3M**
50. **3M3SS**
3 1/2" SSDD 35
51. **3M3DS**
3 1/2" DSDD CALL
52. **3M6SSDD**
5 1/4" SSDD 16.50
53. **3M6DSDD**
5 1/4" DSDD 21.50
54. **3M6DSDD96**
5 1/4" DSDD/96 TPI 35

Dysan

55. **3M8SSDD**
8" SSDD 21
56. **3M8DSDD**
8" DSDD 29
57. **Dys 12**
5 1/4" SSDD 20
58. **Dys 22**
5 1/4" DSDD 26
59. **Dys 33**
5 1/4" DSDD/96 TPI 45
60. **Dys 24**
5 1/4" DSDD/IBM AT 50
61. **Dys 8128**
8" SSDD 27
62. **Dys 8228**
8" DSDD 32

wabash

63. **WAB 1111**
5 1/4" SSSD 12.50
64. **WAB 1212**
5 1/4" SSDD 13.50
65. **WAB 2222**
5 1/4" DSDD 15.50

DISKETTE ACCESSORIES

66. **RSI 600** 5 1/4" Head Cleaning Kit \$ 6
67. **F 320** 3 1/2" Head Cleaning Kit (20 cleanings) 25
68. **MM 5** Media Mate-Holds 50 5 1/4" disks 10
69. **MM 3** Media Mate-Holds 30 3 1/2" 9

CALL TOLL FREE 800-621-1269 EXCEPT Illinois, Alaska, Hawaii

Corp. Accts. Invited. Min. Ord. \$15.00. Above prices reflect cash discount. Add 3% for use of Visa or MasterCard by Mail or Phone. Mail Cashier's Check. Mon. Ord. Personal Check (2 wks. to clear) Add \$4.00 1st item. (AK, HI, P.R. Canada add \$10.00 1st item) \$1.00 ea. add'l ship. & handl. Shipments to IL address add 7% tax. Prices subject to change. WRITE for free catalog. RETURN POLICY: Defectives Only. Most products replaced within 30 days of purchase with identical merchandise only. Computer and large peripherals replaced only when defective on arrival (within 3 work days of delivery). Other problems covered by mfr. warranty. ALL ELEK-TEK MERCHANDISE IS BRAND NEW FIRST QUALITY AND COMPLETE.

ELEK-TEK, Inc.

8557 N. Lincoln Ave., Chicago, IL 60645
(312) 631-7600 (312) 677-7660

OED

lists for spelling-checker software, full-scale dictionaries are not yet available in electronic form to microcomputer users. In the next year, however, Houghton Mifflin plans to make the collegiate version of its *American Heritage Dictionary* available on floppy disk. Merriam-Web-

The OED is in a class by itself, offering information not available from other sources.

ster hopes to distribute its collegiate dictionary on the Knight-Ridder videotext service as soon as problems in displaying dictionary symbols are overcome.

As of yet, database hosts have declined to put general English-language dictionaries on line, says Kenneth Duzy, co-editor of the *Directory of Online Databases*, because consumers are reluctant to pay steep on-line fees for accessing information they can get more easily in a hardcover desk dictionary for under \$20. In fact, even as they make plans to enter the market, the dictionary publishers themselves are openly skeptical of the demand for an electronic product. "Is a dictionary accessible by machine going to give you anything better than a book?" asks Jim Withgott, vice-president of Merriam-Webster. "Most CRTs can't adequately display the special character fonts in any case."

The *NOED*, however, may be immune to these market limitations. The *OED* is in a class by itself, offering information not available from other sources. And since it costs \$1,225 in hard copy (and occupies a bookshelf by itself), on-line access by subscription might be more economical for some.

Database Design

Still, the publishers of the *New Oxford English Dictionary* must design a usable

database. Oxford University Press has recruited researchers at the computer-oriented University of Waterloo in Ontario, Canada, to survey potential users and find

out how they would like to tap the resources of the *NOED*. This information will be used to help design the computer menus and search strategies.

A NEW KIND OF COMPUTER STORE

★ WE DISCOUNT EVERYTHING ★

Hayes

1200 BAUD.....449.95
★ 1200 B INTERNAL389.95
★ INCL. FREE SMARTCOM II SOFTWARE ★



WORDSTAR235.95
WORDSTAR
PROFESSIONAL299.95

PROMODEM 1200319.95
VOLKSWRITER DELUXE...179.95
AMDEK 310A.....169.95
FONTRIX.....79.95
FONTPAKS 1 THRU 9 EA....16.95

SIDEWAYS 44.95

MICROSOFT.

MULTIPLAN129.95
WORD WITH MOUSE.....299.95

COPY II

PC (BACK-UP LOTUS, SYMPHONY,
dBASE AND LOTS MORE29.95

KOALA PAD99.95
PFS: FILE, WRITE, REPORT,
GRAPH, PLAN EA.84.95

dBASE II 269.95
III 369.95

Lotus 123 ...294.95

★ ★ ★ SYMPHONY.....409.95

OKIDATA ★ INCL. FREE PLUG &
PLAY W/IBM CABLE
PURCHASE29.95 ★

★ OKI 92P369.95
★ 93P.....589.95

SILVER REED PRINTERS ★ ★ ★
EXP 400P 12 CPS 80 COL 299.95
EXP 550 P 19 CPS 132 COL 419.95

Rana 10 MEG 1/2 HGT..729.95



AST 6 PAK + 64K259.95
64K RAM (9) SET34.95

FRAMEWORK369.95
MANAGING YOUR \$.....129.95
KNOWLEDGEMAN349.95
DOLLARS & SENSE

W/FORECAST109.95
EPSON FX80 F/T (PLUS)...399.95
GEMINI 10X PC259.95

NEC ★ 2050 769.95
★ 3550 1369.95
★ NEW ★ 8850 55 CPS 1869.95
★ INCL. RIBBON & THIMBLE ★

SIDE KICK39.95
TURBO PASCAL39.95

★ ★ CALL FOR OTHER PRICES ★ ★
BECAUSE HARDWARE AND SOFTWARE
PRICES ARE CHANGING SO RAPIDLY,
WE URGE YOU TO CALL US FOR OUR
VERY LOWEST CURRENT PRICES!
WE APPRECIATE YOUR BUSINESS and will do
everything we can to make you happy
TERMS: F.O.B. Westminster, CA. We accept VISA,
Mastercard, Cash, Money Orders, Checks, Certified
Checks are better. Purchase Orders (2% 10-Net 15).
Add 2% for bank cards & P.O.'s. Ask about our return
policy. Prices are subject to change and hopefully
will go down.
Subject to stock on hand

2/85

GARDEN OF EDEN COMPUTERS

ORDERS ONLY

800-762-3227

OUTSIDE CALIFORNIA ONLY

714-841-4994

INSIDE CALIFORNIA

16485 Magnolia, Westminster, CA 92683
1/2 blk. N. of the 405 Frwy.
Mon-Fri. 10-6:30 Sat 10-5
CLOSED SUNDAYS & TUESDAYS

PROGRAMMER'S GUIDE TO CP/M

Edited by Sol Libes

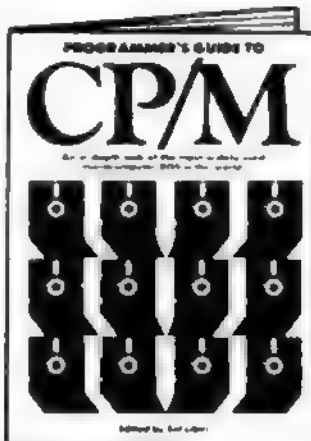
Here's an important collection of CP/M insights that you'll never find in any CP/M manual. CP/M is the most popular microcomputer DOS in use today, and this widespread use has generated many innovative techniques and enhancements of CP/M. *Programmer's Guide to CP/M* tells you what these enhancements are and how to put them to use, how to get around apparent limitations of a CP/M system and why CP/M is far more versatile than you might have imagined. Every article in *Programmer's Guide to CP/M* originally appeared in MICROSYSTEMS between January 1980 and February 1982. Except for this collection, these articles are now unavailable! *Programmer's Guide to CP/M* gives you an in-depth look at CP/M from the viewpoint of the programmer—the individual who creates the software that interfaces directly with CP/M, or who is installing CP/M on systems for which configurations do not already exist.

Contents include "An Introduction to CP/M," "The CP/M Connection," "CP/M Software Reviews," "CP/M Utilities & Enhancement," "CP/M 86" and "CP/M Software Directories." \$12.95.

For
faster service,
PHONE TOLL FREE:

800-
631-8112

(In NJ only,
201-540-0455)



Also available at your
local bookstore or com-
puter store

MICROSYSTEMS PRESS

Dept. FE6C 39 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ *Programmer's Guide to CP/M* at \$12.95* plus \$2.00 postage and handling each. Outside USA add \$3.00 per order. *14C

☐ **PAYMENT ENCLOSED \$** _____
*Residents of CA, NJ, and NY State add applicable sales tax

☐ **CHARGE MY:**
(Charge and phone orders \$10 minimum)
☐ American Express
☐ MasterCard ☐ Visa

Card No. _____

Exp. Date _____

Signature _____

Mr / Mrs. / Ms. _____
(please print full name)

Address _____ Apt. _____

City _____

State _____ Zip _____

☐ Send me a FREE Creative Computing Catalog

OED

computer. Add: 2. A calculating-machine; esp. an automatic electronic device for performing mathematical or logical operations; freq. with defining word prefixed, as *analogue, digital, electronic computer* (see these words).

1897 *Engineering* 22 Jan. 104/2 This was... a computer made by Mr. W. Cox. He described it as of the nature of a circular slide rule. 1915 *Chambers's Jnl.* July 478/1 By means of this computer the task is performed mechanically and almost instantaneously. 1941 *Nature* 14 June 753/2 The telescope drive is of an elaborate nature; the effects of changing refraction, of differential flexure and of errors in the gears are automatically allowed for by a system of 'computers'. 1944 *Times* 8 July 2/2 The Mark XIV consists of... a rectangular box called the computer, which might be described as the brains of the machine. 1946 *Jnl. Appl. Physics* XVII. 262 (heading) A computer for solving linear simultaneous equations. 1946 [see *ELECTRONIC a. 3]. 1947 [see *DIGITAL a. 4]. 1957 *Technology* Mar. 9/1 The advent of the electronic digital computer, with its ability to make simple logical decisions, now permits a further step forward by supplementing the brain power required to supervise the control of manufacturing processes. 1957 *Ibid.* July 167/3 At present a computer can read, remember, do arithmetic, make elementary decisions and print its answers. 1958 *Listener* 18 Sept. 413/2 Much work was done... trying to 'programme' a computer to play chess. 1963 *Publishers' Weekly* 5 Aug. 80/1 Computers are being used to speed up the production of justified tape for the operation of typesetting machines. 1964 F. L. WESTWATER *Electronic Computers* i. 1 The popular idea of a computer as an electronic 'brain' is not e... Basically... a computer is... a calculating...

This excerpt from the OED entry for *computer* demonstrates the dictionary's etymological sophistication and the complexities of putting this mammoth work on-line.

Frank Tompa, University of Waterloo computer science professor, has begun work on a preliminary design of the data structure and software for the electronic *NOED*. "We're trying to identify the entities and relationships that make up the data in the dictionaries," Tompa says. "Some relationships that are not explicit in print can be made explicit in the database. We might be interested in linking words that have identical pronunciations, words that have similar etymologies, or words that were introduced to the language at the same time."

The database will probably also offer easily accessible subdictionaries specializing in the terms used by such professions as medicine, law, sports, and music. Or, perhaps, computer science.

Microcomputer technology has come far since 1970, the year of the *OED*'s last historical entry for the word *computer*, which refers only to computer typesetting developments but alludes to the technical changes that were yet to come: "One of the unnerving things" about computers, the quotation states, "is the pace at which developments take place." ■

EPSON

RX-80 100 cpi thermal vector f.d. Call
RX-80 F77 above/below 132 cpi. Call
FX-80 100 cpi 80 column. Call
FX-80 100 cpi 132 column. Call
FX-80 color printer 160 dpi. \$950
LQ 1500 240 cpi 136 column. \$589
Parallel interface for LQ 1500. \$149
Tractor for LQ 1500. \$55
Cut Sheet Feeder. \$150

OKIDATA

82A 120 cpi 136 column. \$315
83A 120 cpi 136 column. \$355
84P 120 cpi 136 column. \$379
92P 100 cpi 80 column. \$599
92P 100 cpi 136 column. \$599
2410P 360 CPS 136 col. tractor. \$2,195

C. ITOH

B 16A 120 cpi 136 column. \$315
B 170 SP above/below 132 cpi. \$499
B 170 SCP above/below 132 cpi. \$599
1650 136 cpi 132 column. \$525
1650 SP above/below 132 cpi. \$599
1650 SCP above/below 132 cpi. \$799
F 10 40 cpi 136 column. \$899
F 10 55 cpi 136 column. \$1,199
Tractor for F 10. \$225

STAR GEMINI

Gemini 10X 120 cpi 80 column. \$265
Gemini 15X 120 cpi 132 column. \$265
Delta 10 160 cpi 132 column. \$495
Delta 15 160 cpi 132 column. \$495
Rader 10 200 cpi 80 column. \$575
Rader 15 200 cpi 132 column. \$575

IBM

IBM PC COLOR PRINTER
A high speed color printer for graphics & text. \$1,595

IDS PRISM

IDS Prism 800
A high speed color printer for graphics & text. \$1,095

DATAPRODUCTS

8050
8050C
8070
8070C
200 sheet bin feeder. \$795

TEXAS INSTRUMENT

T1 855
A high speed color printer for graphics & text. \$775
T1 855C
A high speed color printer for graphics & text. \$795
T1 855C
A high speed color printer for graphics & text. \$795

TOSHIBA

240 cpi color printer for graphics & text. \$1,195
P1351 132 cpi color printer. \$1,195
P1340 160 cpi color printer. \$1,195
Cut Sheet Feeder. \$750
B Directional Tractor. \$195

DIABLO

C-150 Color Ink Jet Printer - 20 cpi
160 dpi color printer. \$1,295
Diablo ECS/IBM 40 cpi color printer. \$1,850
F32 Tractor color printer. \$1,195
Diablo P320C 150 cpi color printer. \$795
Diablo P38 300 cpi color printer. \$1,695

NEC SPINWRITER

3550 12 CPS 201 cpi. \$1,495
2050 12 CPS 201 cpi. \$1,495
7730 12 CPS 201 cpi. \$1,495

HP ThinkJet Ink Jet Printer

150 cpi 80 column. \$1,120
36 cpi 132 column. \$1,495
100 cpi 136 column. \$2,995

FORTIS DX 15XL

20 cpi color printer. \$1,195
36 cpi color printer. \$1,195
100 cpi color printer. \$1,195

BROTHER

HR 25 240 cpi color printer. \$1,195
HR 35 240 cpi color printer. \$1,195
Tractor. \$119
Cut Sheet Feeder. \$189
HR 1A 240 cpi color printer. \$1,195

BROTHER DM-40

240 cpi color printer. \$1,195
36 cpi color printer. \$1,195
100 cpi color printer. \$1,195

JUKI

6100 240 cpi color printer. \$1,195
6100 36 cpi color printer. \$1,195
6100 100 cpi color printer. \$1,195

QUME

LetterPro 20 240 cpi color printer. \$1,195
36 cpi color printer. \$1,195
100 cpi color printer. \$1,195

FUJITSU

SP 830 240 cpi color printer. \$1,195
SP 320 36 cpi color printer. \$1,195
Tractor. \$1,195
Cut Sheet Feeder. \$1,195

AST

Multi-Function Cards for IBM PC and XT
Memory installed on card. \$4K 128K 192K 256K 320K 384K
with parallel serial ports & clock. \$249 \$299 \$349 \$399 \$449 \$499
above plus game port. \$279 \$329 \$379 \$429 \$479 \$529

QUADRAM

9-function memory expansion card
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive

IDEA

IDEAmax 384 MULTIFUNCTION CARD FOR PC/XT
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive
• 16MB DRAM • 16MB DRAM drive

Hard Disk Sale

Maynard WS 1 10MB hard disk. \$895
Maynard WS 2 10MB hard disk. \$895
Maynard WS 3 10MB hard disk. \$895

TURBO-10

10MB hard disk. \$895
10MB hard disk. \$895
10MB hard disk. \$895

DAVONG HARD DISKS

10MB hard disk. \$895
10MB hard disk. \$895
10MB hard disk. \$895

Sysgen

Tape Backup
10MB hard disk. \$895
10MB hard disk. \$895
10MB hard disk. \$895

Modem Sale!

Hayes 300c modem. \$199
Hayes 1200c modem. \$499
Hayes 2400c modem. \$599
Hayes 9600c modem. \$799
Hayes 14400c modem. \$999

Plotter Sale

Hewlett Packard
4740A 12 cpi color printer. \$1,195
4750A 12 cpi color printer. \$1,195
4760A 12 cpi color printer. \$1,195

IBM

PC XT AT
SALE PRICES
64K PC keyboard no drive. \$1250
256K PC 1MB memory. \$1,725
256K PC 2MB memory. \$1,955
256K PC 4MB memory. \$2,595
256K Portable 1MB down. \$2,095
256K Portable 2MB down. \$2,450
256K Portable 4MB down. \$2,795

10-MB HARD DISK

only \$699 complete
replace your IBM PC or XT with a 10MB hard disk. \$699
replace your IBM PC or XT with a 10MB hard disk. \$699
replace your IBM PC or XT with a 10MB hard disk. \$699

MONITOR SALE

Enhance your IBM AT Now!
384K memory expansion card. \$449
20 MB HARD DISK. \$1,095

SOFTWARE FOR IBM PC

Lotus 1 2 3. \$289
Symphony Upgrade Kit. \$149
SYMPHONY. \$435
dBASE II. \$285
dBASE III. \$375
dBASE III Upgrade Kit. \$149
FRAMEWORK. \$375
WORDSTAR PRO PAK. \$299

THE POWER CENTER

Power supply & cooling fan. \$699
20MB hard disk. \$1,295
40MB hard disk. \$1,995
40MB hard disk. \$1,995
40MB hard disk. \$1,995

COMPAG

Compag 240 240 cpi color printer. \$1,195
Compag 360 36 cpi color printer. \$1,195
Compag 480 48 cpi color printer. \$1,195

DATA SWITCHES

High speed data switch. \$1,195
High speed data switch. \$1,195
High speed data switch. \$1,195

AMBER SCREEN

Amber 300A 12 cpi color printer. \$1,195
Amber 300A 12 cpi color printer. \$1,195
Amber 300A 12 cpi color printer. \$1,195

Highest Quality Shielded Cables

Parallel cable. \$19
Serial cable. \$19
Smart Cable (male or female). \$19
Keyboard Extension Cable. \$10



The \$14.95 Peripheral

That Puts Your Computer's Commands Where They Belong And Your Manuals On The Shelf.

Now, you can command new computer productivity. Discover how much easier your personal computer is to use when the commands are at your fingertips. PC-DocuMate™ keyboard templates can save you time and frustration. You can recall needed commands, options and formats. Quickly. **Professionally designed and comprehensive.** Each PC-DocuMate template has been designed by a software expert. Commands are logically and functionally organized so you can get the most from your software. And our templates are comprehensive reference aids which use both sides to document a product or a system. Completely.

Durable and guaranteed. PC-DocuMate templates are silk-screened onto durable, non-glare plastic to our exacting specifications. Each template is printed on both sides and color-coordinated to complement your PC. And your satisfaction is guaranteed. Fully. Or your money back.

Save time and enjoy greater productivity. Order your PC-DocuMate without delay.

Lower prices for better design. With PC-DocuMates, you get two-sided templates for less than a single-sided template from other manufacturers. And you get a better designed template. Order direct or ask your local dealer.

PC-DocuMates now available...

IBM PC/XT & COMPAQ — \$14.95

DOS/BASIC 2.0 & 2.1 • DOS BASIC 1.1 • Lotus 1-2-3 • Symphony • dBASE II • dBASE III • Framework • WordStar • MultiMate 3.20 • VisiCalc • Multiplan 1.00 or 1.06 • Volkswriter Deluxe • SuperCalc • PeachText 5000 • EasyWriter II • Turbo Pascal • WordPerfect • Do-It-Yourself

COMMODORE 64 — \$12.95

BASIC & more • Calc Result • EasyScript • Quick Brown Fox • Do-It-Yourself
(CBM 64 templates are printed on one side only.)

IBM PCjr. — \$12.95

DOS/BASIC 2.1 • MultiMate • dBASE II • Do-It-Yourself

APPLE IIe — \$14.95

WordStar • VisiCalc • dBASE II • AppleWriter II • Quickfile • Do-It-Yourself

If your favorite software package is not shown here, you can order our 'Do-It-Yourself' template (which includes a special pen and eraser) and develop your own custom keyboard template.

Our Guarantee. Use your template for 20 days. If you are not completely satisfied return it to us (undamaged) for a full refund.

HOW TO ORDER: Send personal check, money order or MasterCard/VISA credit card information. Please add \$1.50 for shipping and handling per order. Foreign orders must add \$5.00 per unit (except Canada). US funds only. Sorry, but no COD's. NC residents add 4% sales tax. Corporate quantity discounts available. Dealer inquiries invited. And for faster service on credit card orders...

Call Toll Free
1-800-762-7874

(In North Carolina) 919-787-7703



SYSTEMS MANAGEMENT ASSOCIATES
3700 Computer Drive, Dept. B-8
Raleigh, North Carolina 27609

CIRCLE 441 ON READER SERVICE CARD

The following trademarks are acknowledged: IBM Corp. IBM IBM PC XT & PCjr. Ashton Tate. dBASE II. dBASE III. Framework. Information Unlimited Software, Inc. EasyWriter II. Lotus Development Corp. Lotus 1-2-3. Symphony. SoftWord Systems, Inc. MultiMate. Microsoft Corp. Multiplan. PeachTree Software, Inc. PeachText 5000. Sorcim Corp. SuperCalc. LittleTree Software, Inc. Volkswriter. MicroPro International Corp. WordStar. QuickText. Quick Brown Fox. Handic Software, Inc. Calc Result. Commodore Business Machines, Inc. EasyScript. VisiCorp. VisiCalc. Apple Computer, Inc. Apple IIe. AppleWriter II. Quickfile. Borland International, Inc. Turbo Pascal. Satellite Software International, Inc. WordPerfect.

PC-DocuMate is a trademark of Systems Management Associates. ©SMA 1984

Strategic Moves

Baron and Computer Diplomacy simulate the worlds of finance and modern warfare to show that in matters of financial or political conquest, cunning and strategy are king

I have heard the business of real estate investment described as a cross between war and sport, where those who go for wool often return shorn. Indeed, the common demonimator that interests us in business, war, and sport is the competition between at least two players. And that is the only real shortcoming of *Baron*: it is for one player.

I did not complain about the single-player nature of *Tycoon*, Blue Chip's last game (see *PC*, Volume 3 Number 18) because in the commodities market, it is you against the numbers. But real estate investment—fraught with cutthroat competition—is different, and the lack of human or even computer opponents in *Baron* will cost it some appeal. *Baron* is a financial race against time or your previous performance, whichever you prefer. It is not complicated with human ne-

gotiations and alliances, as is *Computer Diplomacy*, and I feel it should be.

Getting Richer

That criticism aside, *Baron* is wonderful. The game is played in 60 turns, each representing 1 month from January 1984 through December 1988. During that time you will invest your initial \$35,000 in your choice of three types of income-producing property, second-mortgage loans, and speculative ventures like Uncle Herman's "real estate

project." The object is to reach a net worth of \$1,000,000 before the game ends. In all probability, you'll borrow as much as you can from the banks, because, as in real life, leverage is the name of this game. If you put down \$5,000 cash on a \$100,000 cooperative apartment and have a bank finance the remaining \$95,000, then your money is leveraged 20 to 1. This is how the poor get richer.

The entire program is menu driven, allowing you to play even if you don't

PC ARCADE

Baron

Blue Chip Software, Inc.
6744 Eton Ave.
Canoga Park, CA 91303
(818) 346-0730

List Price: \$59.95

Requires: 128K RAM, one disk drive; color graphics adapter and color monitor optional.

CIRCLE 792 ON READER SERVICE CARD



REAL ESTATE LISTINGS			
DESCRIPTION			
1	HOUSE-- 3 BDRM / 1 BATH	PRICE: \$69,000 DOWN: 12%	RESI
2	LARGE LOT/UTEM 85X500	PRICE: \$29,000 DOWN: 25%	CA
3	TRIPLEX-- 3 2 BDRM UNITS	PRICE: \$65,000 DOWN: 20%	RESI
4	TRIPLEX PLUS 1 BDRM HOUSE	PRICE: \$62,000 DOWN: 25%	RESI
5	FLAT LOT-- 90X180	PRICE: \$131,000 DOWN: 25%	TX
6	INDUSTRIAL BUILDING-- 7100 SQ FT	PRICE: \$414,000 DOWN: 30%	FL
7	PANORAMIC UTEM HOME SITE-- 50X100	PRICE: \$61,000 DOWN: 25%	TX
8	3 RETAIL SHOPS	PRICE: \$221,000 DOWN: 20%	CA
9	APARTMENT-- 3 UNITS (2 BDR 71 SQ)	PRICE: \$68,000 DOWN: 30%	RESI

ENTER REFERENCE NUMBER OR Y FOR MENU

With a realistic portfolio of investments in a changing market, *Baron* seems like more than just a game.

know what you're doing. The main menu displays your net worth, cash, and status at the top of the screen, below which are listed 11 options. These allow you to call up financial graphs, news, price changes, property descriptions, and your portfolio of investments; to buy and sell real estate, exercise options, and borrow money; to save a game position; and finally, to advance to the next month.

I think you'll enjoy the variety of these information sources because it makes you feel in charge of a research staff. You can find out how the real estate markets are doing in California, New York, Kansas, Florida, and Texas, the five states in which you are allowed to do business. On each turn you can buy up to nine properties from the real estate listing, and the computer changes some from month to month, just to keep things interesting. For example, you might have your eye on a Miami penthouse one month and find it gone the next, particularly if the Florida market goes crazy.

You can get a full-screen listing of each available property, describing everything from square footage and views to price, monthly income it produces, cost of mortgage payments, and operating expenses. Whether it is an industrial building, apartment complex, supermarket, acreage, or a parking lot, you want it to produce more income than it costs you to maintain. And that is where things get tricky, because the complex model mirrors many economic conditions. You can know everything in the world about real estate, but if you don't read the papers, if you don't pay attention to current and historical market trends, if you don't leverage your money well enough, then you will fail the task of turning \$35,000 into \$1,000,000 during the simulated 5-year period.

On PC's scale of zero to six, *Baron* rates:

FUN:	4.5
CHALLENGE:	5.0
SOUND/GRAPHICS:	3.5
TOTAL:	13.0



Computer Diplomacy

Avalon Hill Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
(301) 254-9200

List Price: \$49.95

Requires: 256K RAM, one disk drive, color graphics adapter, color monitor; printer optional.

CIRCLE 791 ON READER SERVICE CARD

"Diplomacy is the art of saying 'nice doggie' until you can find a big rock." I wish I could remember the author of that quotation because it describes the milieu of this epic power struggle to perfection. Many of you remember—indeed, still play—the classic Avalon Hill board game, *Diplomacy*. The rules, map, and number of players (up to seven: the more the better) for this program are identical to those of the original board game, so it can also be used as a "computer referee" along with the physical map and pieces from a *Diplomacy* set.

The time is 1901, Europe is the stage, and seven major powers—Austria-Hungary, France, Germany, Russia, Italy, England, and Turkey—are vying for pieces of the continental pie. The map is displayed on-screen in portions and can be scrolled in four directions with the cursor keys. Although 34 supply centers are strewn about Europe, only 12 are unoccupied at the start of the game. A country wins by occupying 18 supply centers.

The rules for *Computer Diplomacy* are deceptively simple. There are only two kinds of pieces—armies and fleets—and no two can ever be in the same province or sea space. Each unit can move one space per turn. Russia begins with four units (pieces) and four supply centers, and all other countries begin with three of each. To build and introduce a new unit onto the board, you must gain another supply center. And if you lose a supply center during a turn, you lose a unit at the end. Thus, a balance is struck that turns

the road to success into a roller coaster of ups and downs.

There are three phases to each turn (which represents a spring or a fall campaign): diplomacy, order writing, and resolution. And it is the design of the first phase (or lack of it!) that makes this game unique. You see, no single country is strong enough to reach the objective

Everything short
of physical
intimidation is
allowed. Computer
Diplomacy is a
liar's heaven.

alone. Hence, the diplomacy phase is unstructured except for a time limit. Players are free to form alliances, hold secret discussions in other rooms, spy on players having "secret" discussions in other rooms, sign nonaggression pacts, negotiate double deals, triple deals, and betrayals—everything short of physical intimidation is allowed. It is a liar's heaven and an honest person's hell.

In the original game, players write down their moves, reveal them simultaneously, and resolve the differences. But in the computer version, order writing is done from the keyboard by one player at a time. The cryptic abbreviations you must use will seem unfamiliar at first—like TRI A-BUD, which means move the Trieste Army to Budapest—but there is a larger problem with this phase of the game. Other players are not allowed to watch the monitor while you type orders for your armies and fleet. The result of following this rule can range from unpleasant to impractical, depending on the size of your den. In my office at home, all six other players have to crowd into the bathroom to leave the room and we keep the cat's litter in there!

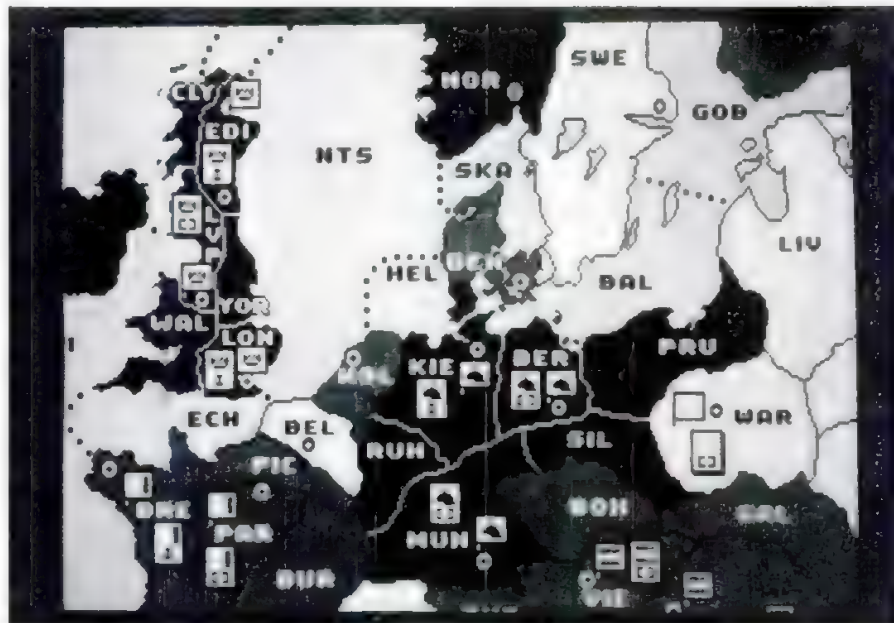
One of the greatest benefits of the pro-

PC ARCADE

gram is its dutiful housekeeping. The computer will not allow players to type in illegal orders. Also, the resolution of all confrontations is controlled by the computer, freeing players from memorizing and applying movement and combat rules. This feature not only makes *Computer Diplomacy* easier and more fun to play than the original but makes the game move faster. Still, it is not a lunch-hour game. With the full complement of seven players (the only way to truly experience *Diplomacy*), you can expect a game to run 6 hours.

On PC's scale of zero to six, *Computer Diplomacy* rates:

FUN:	5.5
CHALLENGE:	6.0
SOUND/GRAPHICS:	4.5
TOTAL:	16.0



Pre-World War I Europe forms the battleground for *Computer Diplomacy*.

TAX SURGEON OPERATES ON YOUR TAX RETURN

TAXbyte, Inc., the people who provide tax software to tax professionals, now brings you an affordable personal tax planning and preparation program—the **TAX SURGEON I**—tax software for the IBM personal computer. For only \$49⁹⁵, it can provide you with the intensive care you need to automatically calculate and print your own tax return. It features simple "fill in the blanks" entry and full screen display for easy input and editing. Prepares up to five returns.

The TAX SURGEON II, \$89⁹⁵, provides the investor or small business owner with computer tax software tailored to special business needs.

Dealer Inquiries Invited

HELP

On screen help messages
help guide you effortlessly
through the income tax maze

REQUIRES

IBM-PC, XT or Jr. with DOS 2.0
or 2.1 or compatible

SURGEON I

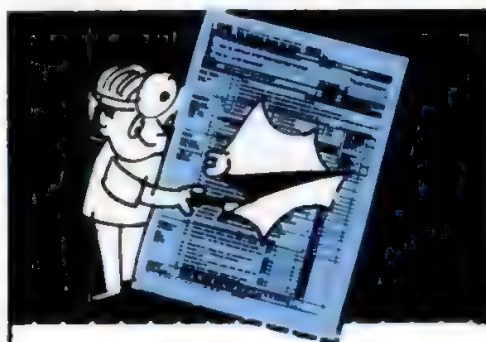
PREPARES & PRINTS

1040 Pg 1	Sch A
1040 Pg 2	Sch W
Wages	2106
Sch A	2119
Sch B	2141
Sch C	3903
Sch D	

SURGEON II

PREPARES & PRINTS

1040 Pg 1	Sch A	4136
1040 Pg 2	Sch W	4255
Wages	Sch B	4562
Sch A	Sch W	4797
Sch B	Sch C	4835
Sch C	Sch D	5695
Sch D	Sch E	6251
Sch E	Sch ES	6252
Sch F		



MONEY BACK GUARANTEE

Send add'l. information
\$49.95 TAX SURGEON I
\$89.95 TAX SURGEON II
Add \$10.00 for Express Mail Service

Name _____
Address _____
City _____ State _____ Zip _____
____ IBM-PC ____ XT ____ P ____ other
____ Check ____ COD ____ VISA ____ MC
Card No _____ Expires _____
Signature _____



Tax Software Since 1981
"The right tax software decision"

TAXbyte, Inc.
3803 - 28th St., Moline, IL 61265
(309) 764-7245

PC-Feb



If your PC is cut off from your mainframe, don't give up. Persyst.

If you're feeling isolated from corporate communications, Persyst can put you in the center of things. That's because we have a wide range of products that offer the solutions you need to incorporate your IBM PC into almost any IBM communications environment.

Our COAX/3270 allows instant micro to mainframe communication. For instance, one solution that can bring your IBM PC and IBM mainframe together is Persyst's COAX/3270. It's a single-slot expansion board that allows you to connect your IBM PC directly into virtually any IBM 3270 environment, merely by changing the software. Then you can use our 3278/79 terminal emulation software to share information between your PC and mainframe, either interactively or under control of our comprehensive file transfer subsystem.

Emulex's 3270 Cluster products let multiple PCs communicate using SNA or Bisync. Our new Distributed Communications Processor (DCP/88-VM) and

Multiple Protocol Communications (MPC) controller allow you to create sophisticated, remote Bisync or SNA 3270 environments. Because of its own dedicated 8088 processor, the DCP/88-VM board combined with our 3270 cluster software, can emulate an IBM 3274-51C cluster controller that supports up to nine devices. This includes five printers and four PCs functioning as 3278/79 display stations.

Maximum configuration flexibility without new hardware. You can use these same hardware products with our other software packages to configure your PC as a single station SNA or Bisync 3270 terminal, or as a 3780, HASP or SNA RJE work station. And because Persyst communications products are all powerful, software-controlled, multiple protocol hardware products, you can accommodate diverse communications requirements — without constantly reinvesting in new hardware. So, if you're an OEM or VAR who's looking for hardware with the flexibility to address

the unique needs of your customers — Persyst has the solution for you!

Reliable performance backed by a two-year warranty. As you can see, Persyst can give you a lot of solutions that will put you in the center of things. And with each one you'll also be getting top quality and reliability. That's because every Persyst product goes through one of the most stringent testing and quality assurance programs in the industry.

So, if you've been feeling isolated lately, let us put your PC in touch with your mainframe. Call or write Emulex Corporation today for complete details on our full family of Persyst communication products.

Persyst Products, Emulex Corporation, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626. Tel: (714) 662-5600.

**EX PERSYST
PERSYST
EMULEX PERSYST**

CIRCLE 256 ON READER SERVICE CARD

REDirecting Your Files

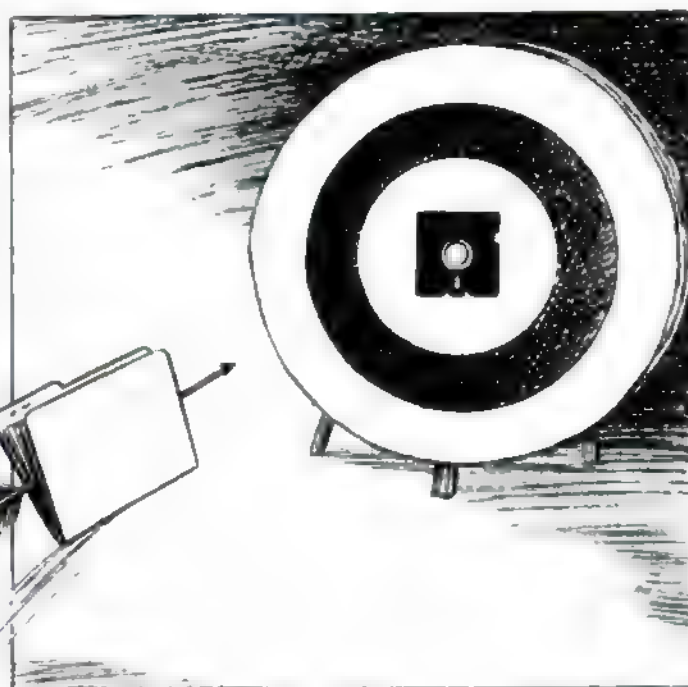
Here's the way to move files from one directory to another without all the usual COPYing and ERASEing bother.

Operating systems designers do their best to provide file management facilities that make maintaining your data and program files as easy as possible. They usually succeed in at least the limited sense that all the things you have to do are possible. They often fail, however, in that accomplishing all those possible things aren't necessarily easy or convenient.

PC-DOS is no exception to this rule. When Version 2.0 was released, in March of 1983, powerful subdirectory facilities were added. These gave PC-XT and other hard disk users a simple way to organize files, and they enhanced file storage facilities for floppy disks as well. PC-DOS Versions 2.1 and 3.0 continued the subdirectory system but added no new capabilities to it.

The subdirectory system works well enough, but a few additional features would make your life much easier. One such missing feature is a command to move a file from one subdirectory to another without physically rewriting it. Standard PC-DOS commands require you to COPY the file from the directory it's in (the source directory) to the one in which you want to put it (the target directory). You then have to ERASE the original file from the source directory. This procedure is inconvenient and time-consuming even on a hard disk, and it is impossible on a

1985/No. 4



floppy disk if you're short on space.

Upgrading Cleanup

When I changed from a PC-XT to a new AT, my files and programs got reorganized during the "housecleaning" that inevitably accompanies such a move. During that process, the COPY/ERASE procedure became simply too painful to bear anymore, so I wrote a command called REDIRECT, or RED for short. REDirect does just what I described above: it changes the directory a file is in (redirects it) without physically moving it.

A major design criterion for REDirect was that its rules and syntax should look as much like those of the PC-DOS COPY



IBM PC 64K, two disk drives, 360K each, drive controller and keyboard. Call for prices on other configurations.

\$1669.00

NEW EXPANDED QUADBOARD BY QUADRAM

\$209.00

One parallel port, one serial port, clock/calendar, OK, memory expansion to 384K, game port, I/O bracket and Quadmaster software.

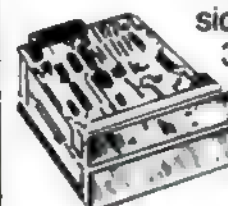
64K\$249.00



TANDON TM-100-2

\$149.00

5 1/4" full height drive, double sided, double density, 320/360K, IBM PC compatible. Specify drive A or B for your PC. Comes with complete step-by-step installation instructions.



OKIDATA ML92/P PRINTER WITH PLUG AND PLAY INSTALLED

\$365.00

160 cps, 80 columns, all points addressable graphics, correspondence quality printing capability. Full IBM-PC compatibility.



AMDEK COLOR II + MONITOR

\$379.00

AMDEK 300G MONITOR

\$125.00

USR PASSWORD MODEM

\$299.00

USR PASSWORD W/TELPAC

\$359.00

DATASHIELD SURGE

PROTECTOR MODEL 85

\$49.00

Filters out voltage jumps, electromagnetic interference and radio frequency interference. Features six outlets, on/off power switch and reset button.

DATASHIELD PC200

\$299.00

Backup power source, provides up to 30 minutes of continuous 120 VAC, 60 Hz power (load dependent). Also eliminates voltage surges and noise.

TG JOYSTICK

\$32.00

COMPUSERVE STARTER KIT

\$25.00

HOURS:
Mon-Fri. 9 AM to 9 PM

GEM

CALL
203-888-1867

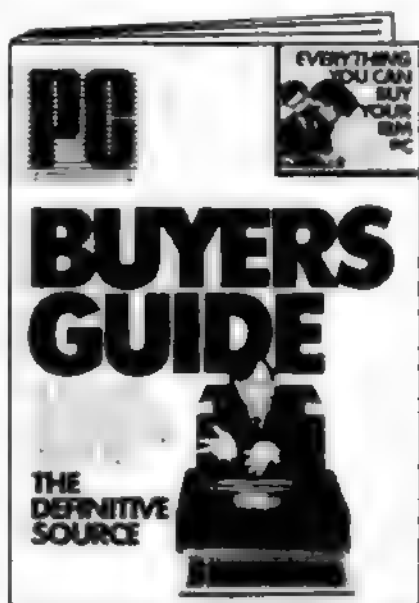
GEM ELECTRONICS, INC.
24 Carriage Drive, Oxford, CT 06483



COD No Surcharge,
VISA & MC Add 3%

CIRCLE 255 ON READER SERVICE CARD

INTRODUCING THE INDEPENDENT GUIDE TO PRODUCTS, SERVICES, PERIPHERALS AND SUPPORT ITEMS FOR YOUR IBM PC OR XT



With literally thousands of different products on the market that

are compatible with your IBM PC or XT, how do you find the ones you need? How do you decide which ones are best for you?

With *PC Buyers Guide*—over 500 pages of listings for IBM-compatible hardware, software and services—from the publishers of *PC Magazine*.

Every product is fully and accurately described. You'll know what it is, what it does, how much it costs, and what level of skill is required—novice, intermediate or technical.

And in addition to PC hardware and software, you'll get details on all the important extras such as accessories, furniture, books, and consultants.

To order your copy of *PC Buyers Guide*, simply fill in the coupon below and mail it today.

Mail to:

PC BUYERS GUIDE

CN 1914, Morristown, NJ 07960

Please send me _____ copy(ies) of *PC Buyers Guide*. I enclose \$7.95* for each copy, plus \$1.50 for postage and handling.

Outside the U.S.A., the price is \$10.00; send U.S. funds only. *Residents of CA, CO, CT, DC, FL, IL, MA, MI, MD, NJ, NY State and VT add applicable sales tax.

Name _____
(please print)

Address _____

City _____

State _____ Zip _____

FD8C

PROGRAMMING

command as possible. The REDirect syntax is

```
RED [d: ][(source) path]
    filename[.ext]
    [d: ][(target) path]
```

The source filename may include PC-DOS wildcard characters (? and *). And, as with COPY, you enter a space between naming the source and specifying its destination.

REDirect's syntax does make two exceptions to COPY's rules, however. The first is that REDirect's source and target disk drives must be the same (COPY's can be different). The other is that REDi-

REDirect makes extensive use of the PC-DOS function calls available through interrupt 21H.

rect does not allow simultaneously renaming the file, as COPY does. When REDirect changes a file's directory, its original name is retained. You can, of course, RENAME it later if you want—or change REDirect to allow renaming files, if you're energetic.

Calling on Function Calls

REDirect is an assembly language program that makes extensive use of the PC-DOS function calls available through interrupt 21H. If you decide to implement it, you will probably want to have the *PC-DOS Technical Reference* manual available for information about how each function call works.

The first half of the program (through the label FIND_FILE: in Figure 1) is devoted to parsing the command line into the source file and target path and to making sure the resulting ASCII string formats meet REDirect's requirements. (The Z stands for a byte of zeros at the end of the

string, as the *DOS Technical Reference* manual notes.) The code is complicated, and you'll wish PC-DOS would take care of this for you before you're done.

PC-DOS commands can be input in either upper- or lowercase letters, and five different characters (blank, comma, semicolon, equals sign, and tab) can be used as delimiters to separate parameters. REDirect's first pass (starting at CLEAN_PARMS:) through the parameter string (which PC-DOS puts at location 80H of the program segment prefix, or PSP) converts lower- to uppercase letters and changes all valid delimiters into blanks. This makes the parameter string consistent and easier to work with.

The next job (starting just above FIND_PARMS:) is to separate the parameters into two separate pieces (remember, any number of delimiters can separate parameters) and to store them in memory areas called SOURCE_FILE and TARGET_PATH. The first byte of each memory area is set to the number of data bytes stored in it. The algorithm employed by REDirect loads the maximum number of expected parameters into the DX register, and it puts a pointer to the first memory area in the BX register. The algorithm requires that the memory areas be stored contiguously and be exactly the same length.

Once SOURCE_FILE and TARGET_PATH are stored in program memory, REDirect has to make sure their syntax is correct and that the location where the filename can begin in each parameter's memory area is known. The location is the first byte after the backslash character (\) used by PC-DOS path names.

The code starting at FIX_UP: locates the last backslash in SOURCE_FILE (it searches backwards from the last byte), and then stores this location in SOURCE_END. If no backslash is found, no source directory was specified, so SOURCE_END is set to the second byte (byte 1) of SOURCE_FILE. An exception is made if a disk drive was specified, in which case SOURCE_END is set to the

PROGRAMMING

fourth byte (byte 3). This allows the source file's path specification to default to the current directory and drive, or to the current directory for a named drive.

After SOURCE_FILE has been fixed, REDirect checks TARGET_PATH for validity. If no TARGET_PATH was specified, the program jumps to NO_TARGET:, which allows subsequent function calls to default to the current drive and directory. If a TARGET_PATH was specified, its last character is checked to see if it was a backslash. If so, TARGET_END is set to the next byte; if not, a backslash is inserted. An exception is made if only a disk drive was specified. In that case, TARGET_END is set to the first byte after the colon, allowing the target path to default to the current directory of the specified drive.

And Now for the Fun Part

So much for REDirect's more gruesome chores! The rest of the program (starting at FIND_FILE:) is fun, since PC-DOS function calls do all the hard work. The first function needed is 4EH, which finds the first file in a directory that matches a file specification. Function 4EH is paired up with 4FH (see below) to allow REDirect access to PC-DOS's wild card filename facility.

Everything done above ensures that SOURCE_FILE is correctly formatted as an ASCII string (including a file specification, an optional disk drive, and a path name specification) that can be used by function 4EH. All REDirect now needs to do is to move the address (offset) of SOURCE_FILE (plus one, to account for the byte count field) to DX. The CX reg-

ister is set to zero to tell function 4EH to search only for normal files.

When interrupt 21H returns, the carry flag is used to indicate an error condition. When function 4EH is used, the carry flag simply indicates that no file matching SOURCE_FILE's specifications was found (other function calls can require more complex interpretation of errors). In that case, REDirect exits with an error message by jumping to ERROR_EXIT with DX pointing to the "File not found" error message.

If a file was found, REDirect copies its name from the filename portion of the default Disk Transfer Area (PC-DOS locates this at offset 9EH in the PSP) to SOURCE_FILE and to TARGET_PATH. The locations for the filename in those areas are specified by using both the

```

RED segment para public 'code'
    assume cs:RED, ds:RED, es:RED, ss:NOTHING
    org 100h ; .COM format
BEGIN:
    jmp CODE_START ; Jump around data declarations
;
DECLARE: ; Messages, Storage Areas, Equates
COPYRIGHT db 'REDirect (C) 1985, Dickinson Associates Inc.'
          db 13,10,'$'
PATH_FILE_LEN equ 77 ;Length = 1, Path = 63, FileName = 12, 0 = 1
SOURCE_FILE db PATH_FILE_LEN dup (0)
TARGET_PATH db PATH_FILE_LEN dup (0)
SOURCE_END dw 0
TARGET_END dw 0
PC_DOS_VER db 0
VALID_IN db 'abcdefghijklmnopqrstuvwxyz,;= ',9
VALID_OUT db 'ABCDEFGHIJKLMNOPQRSTUVWXYZ',4 dup(32)
VALID_NUM equ $ - VALID_OUT + 1
ERR_FLAG db 0
ERR_HEAD db 10,13,'REDirect Error - $'
BAD_VERSION db 'Incorrect PC-DOS Version$'
NO_PARMS db 'Correct Syntax is:',13,10,10
db 'RED [d:][source_path]source_filename[.ext] [d:][target_path]$('
FILE_NOT_FOUND db 'File Not Found$'
PATH_NOT_FOUND db 'Target Path Not Found$'
PC_DOS_2_PATCH db 13,10,'or $'
DRIVES_CONFLICT db 'Source and Target Disk Drives Conflict$'
UNDEFINED_ERR db 'Undefined Error: PC-DOS Function 56H$'
ERR_TAIL db 10,10,13,' . . . Aborting',10,13,13,'$'
GOOD_MSG db ' . . REDirected to . . $'

```

(continues)

Figure 1: The assembly language program for RED.COM. If you don't have IBM's assembler, turn on your modem and call the PC Bulletin Board at the number listed in the masthead.

Call Oryx and order by phone ...without a single hang-up!

SOFTWARE

Alpha Software

ESP \$529
Electric Desk (PC) \$229
Electric Desk (Jr) 199

Arrays Inc.

Home Acct't + \$ 95
Home Acct't + w/
Tax Advntg. \$139

ATI

All Training Prog's. ea \$ 49

B&L

Multi-job \$145

BPI

Personal Acct'g \$ 69

Borland

Side Kick \$ 37

Turbo Pascal 37

Cdex

All Training Prog's. ea \$ 49

Central Point

Copy II PC \$ 34

common language
systems, inc.

PLAIN ENGLISH \$499

CompuServe

Exec Info Service \$ 69

CompuView.. See Special

Connecticut Software

Printer Boss

w/ Letter Boss \$ 79

Above w/ Side Kick... 119

Decision Resources

Chart-Master \$255

Sign-Master 195

dBASE II CORNER

Anderson-Bell

Abstat \$289

Ashton-Tate

d-Base II Call

d-Base III Call

Framework Call

Friday Call

Fox & Geller

dGraph \$169

Quick Code 169

dUtil 58

Human Soft

db Plus \$ 85

(All above available
on PC-DOS.)

Digital Marketing

Grammatik \$ 60

Proofreader 42

Digital Research

Avail in CP/M or PC-DOS:

Fortran 77 \$345

Pascal MT+ Call

C Compiler/Lang 240

Display Mgr 345

Access Mgr 275

DR Assem & Tools 140

DR Graph 135

Concurrent 240

Avail CP/M only:

C Basic-86 Interp. 140

CP/M-86 49

Personal Basic 105

Speed Programming

Package (SPP)

for Pascal MT+ 140

Dow Jones

Spreadsheet Link \$179

Investor's Workshop... 95

Home Budget 89

Ecosoft, Inc.

Microstat \$239

Emerging Technology

Edix (editor) \$139

Wordix (formatter) 139

Prof Writers' Pkg. 389

Enertronics

Energraphics \$259

w/ Plotter Option 299

Fastware

Thor (the thought

organizer) \$245

Financier, Inc.

Financier II \$119

Tax Series 105

Fox & Geller

Grafox \$189

R-Graph (for

R-base 4000) \$175

Harvard Associates

PC Logo \$129

Harvard Software

Project Manager \$249

Hayes

Smartcom II \$ 95

Please Call

Heritage

Smartkey II+ (w/Print) \$ 75

Howard Soft

Tax Preparer Call

HyperGraphics Corp.

Authoring Graphics ... \$299

Presentation Graphics.. 279

HyperGraphics Corp.

(continued)

Object Libraries:

Computer Aids \$ 49

Maps 49

Borders 49

IMSI

PC Paintbrush \$ 99

Individual Software

Prof. DOS \$ 47

Prof. Pixel 47

LOTUS 1-2-3

CORNER

Programs for
your LOTUS 1-2-3

Consumer

Software, Inc.

"Auditor" (proof-

ing tool) \$ 85

Lighthouse Software

Key II (Data

Mgmt for 1-2-3) \$149

National Training

Systems, Inc.

Putting 1-2-3 To Work

(8 application tem-

plates on diskette) .. \$ 79

Strategic Software

Systems, Inc.

Bottomline V \$195

Innovative Software

Fast Graphs \$229

Lifetree Software

Volkswriter Deluxe \$155

Living Videotext

Think Tank (256K) \$119

MDBS, Inc.

Knowledge Man \$275

K Graph 179

K Text 129

K Paint 79

Menlo Corp.

In-Search \$299

MicroPro

WS ProPak (WS,

CS, MM, SI) \$275

WordStar 175

WordStar 2000 289

Wordstar 2000+ 349

Pro Options Pak 109

ProPak Plus (WS, CS,

MM, SI, TM) \$369

TeleMerge 109

Micrarim

R-Base \$279

R-Base Clout (2.0) 159

Report Writer 95

Microsoft

Chart \$159

MuMath/MuSimp 179

Pascal Comp (DOS) ... 199

Project 169

C Comp (MS DOS) ... 319

Basic Comp (MS DOS) 249

Multiplan 1.20

(MS/DOS) \$129

Word 1.15 229

Word w/ Mouse 299

Others Call

Microstuf

Crosstalk \$ 99

Remote Call

Morgan Computing

Professional Basic \$ 79

Trace 86 99

Pathfinder 59

Multimate Systems Inc.

Multimate (Vers 3.3) ... \$289

North American

Memory Shift \$79

Northwest Analytical

Statpak \$365

Oasis

Word Plus \$110

Punctuation & Style... 99

Open Systems

Acct'g Programs \$419

Buy 3 or more @ 399

Opt-Tech

Data Processing

Sort \$ 79

Pal Software

Artpak (PC, XT, Jr) \$ 75

Peachtree Software

Back to Basics

Acct'g System \$219

PeachPak 4

(GL, AP, AR) \$229

Series 8, ea. mod 359

Peter Norton

Utilities \$ 50

PowerBase Systems, Inc.

Power-base w/

DATAZOOM \$259

Prentice Hall

VCN Execuvision \$299

Samna Corp.

Word III \$349

SPI Open Access \$319

Satellite Software

Data (sm. data base) .. \$139

Word Perfect w/ Sp... 255

Others Call

PCjr.

Please call us
regarding products
for the IBM PCjr.

Softcorp, Inc.

PRO-JECT 6

(Complete Critical

Path Mgmt Syst.) Call

Softcraft

Fancy Fonts (V 2.0) ... \$125

Software Arts

TKI Solver \$265

Spotlight 109

Software Publishing

PFS: Access, Proof \$ 59

PFS: File, Graph, Write 89

PFS: Plan 89

PFS: Report 79

Star Software

Property Mgmt \$625

Accounting Partner ... 219

Acctg Partner II 599

Supersoft

Disk Doctor \$ 69

Fortran 299

Scratchpad Plus 159

Warner Software

Desk Organizer \$175

Westminster Software

Pertmaster Call

...and many more!

ST. PATRICK'S DAY SPECIAL!

CompuView

Products, Inc.

Powerful productivity

pkg including:

» Vedit+ - Full screen

editor; Multiple-file

editing, sort files,

arithmetic operations,

etc.

» V-Print - Print

formatter.

» V-Spell - Spelling

corrector w/ 60,000

word dictionary.

Special pricing on

3 packages \$299

OTHER SPECIALS

Vedit \$119

Vedit+ 159

V-Print 89

V-Graph 89

Transyl 89

BOARDS

DISPLAY CARDS

Amdel	
MAI Card.....	\$399
Fredericks/Plantronics	
Colorplus ..	\$399
Heraules	
Graphics Board	\$339
MA Systems	
Peacock Cir Bd.....	\$249
Paradise	
Display Card	
(clr/monochrome). \$349	
Modular Display Card.....	\$309
Quadram	
Quadcolor I.....	\$199
Quadcolor II.....	389

AST Research

Six Pak Plus 64K (S&P, Clk, exp to 384K).....	\$265
MegaPlus 64K, (Cl/Cal, S Port, 512K cap w/ Megapak).....	\$269
Extra ports for Mega-plus and I/O Plus II (Game, P or S).....	\$ 40
Megapak 256K exp... Call	
I/O Plus II (Cl/Cal, S Port).....	\$159

New AST to IBM

Mainframe connection now available:

5251 - SNA - BSC -	
3780 - PCOX.....	Call
Monograph Plus.....	Call

PC NETWORKING

(Please call for configurations and prices.)

AST Research

PC 002 NET	
Starter Kit.....	\$899

Corvus

Orchid Technologies

The "Orchid Blossom" board to 384K, Clk, w/ alarm, S&P ports, ram disk & disk caching, upgradeable to PCNet).....

Quadram

Add Networking Products.....

Maynard Electronics

Floppy Drive Cntrlr....	\$119
w/ Par Port.....	169
w/ Ser Port.....	179
Sandstar.....	Call

Orange Micro

Mr. Chips..... \$369

Quadram

Quadboard 64K, (exp 384K, Clk/Cal, S&P)...	\$269
Microfazer Stack Printer	
-P/P 8K.....	\$139
-S/P 8K (exp 64K only)	149
-S/S 8K (exp 64K only)	149
Quadlink 64K Mem....	\$469
All Other Products	Call

Tecmar

Graphics Master.....	\$479
Captain's Board.....	299
1st Mate.....	259
2nd Mate.....	250
3rd Mate.....	379
Jr. Captain (128K, C, P)	329
Jr. 2nd Mate (C, P)....	129

PRINTERS

C. Itoh Electronics

Prowriter	
8510 AP (Par).....	\$349
8510 PC-II (Ser)	
(w/ 32K Buffer).....	499
1515P.....	599
Starwriter	
F10-40P (40 cps).....	999
A10-20S (20 cps).....	529

Diablo

630 ECS.....	Call
630 API.....	Call

Juki 6100.....

Mannesman Tally.....

NEC 3550.....

Okidata 82-93.....

Quadram Quadjet... Call

Siemens Ink Jet Printers PT88.....

Silver Reed

500P (P or S) (16 cps letter quality).....	\$395
--	-------

EXP 770P (P or S)

(36 cps, 2K buffer, letter quality).....	899
--	-----

Star Micronics.....

...and much more.

MONITORS

Amdel

300A Amber.....	\$149
310A.....	Call
300 Clr.....	\$299
500 Clr RGB.....	449
600 Clr HR.....	549
700 Clr Ultra HiRes....	629

NEC

JB1201-12" Green.....	\$169
JB1260-12" Green.....	119
JC1216 RGB.....	429

PGS

HX12 RGB Color.....	\$489
MAX 12.....	189

Quadram

Quadchrome.....	\$489
-----------------	-------

Sanyo

8112 12" HR Green....	\$195
-----------------------	-------

USI 1200A

12" HR Am.....	\$139
----------------	-------

Zenith.....

ULTRA HI-RES MONITORS

PGS

SR-12

(690 x 480 Pxls) ... \$639

Doubler Card

for SR-12..... \$175

(Note: Doubler card works in conjunction w/ standard color/graphics adapter for hi-res.)

Taxan

RGBvision 440 (720 x 400 Pxls) ... \$675

Persyst

BoB Bd for 440 \$475

(Note: BoB Board replaces standard color/graphics adapter to provide superior resolution.)

DISK DRIVES

CDC 1800.....

Corvus HD.....

I-Omega

Bernoulli Box.....

Maynard HD.....

Tallgrass.....

(for Wisconsin customers)

Tandon TM-100-2..... \$175

Mountain, Inc.

FileSafe Combo

Disk/Tape Pack for the IBM PC or XT

Model 01-4000-04-

35MB HD w/ 27MB

tape back-up

Model 01-4000-06-

35MB HD w/ 60MB

tape back-up

For more info..... Call

DISKETTES

3M 5 1/4" DS, DD

(Box/10)..... \$ 35

Maxell

MD2-HD (diskettes for the IBM-PC-AT, Box/10)..... \$ 69

Ultramagnetics

5 1/4" DS, DD (Box/10) . \$ 32

Verbatim

5 1/4" DS, DD (Box/10) . \$ 32

MODEMS

Hayes

Smartmodem 300..... \$195

Smartmodem 1200 475

Smartmodem 1200B... 399

Microcom, Inc.

Era 42 (1200 int baud) .. \$395

Novation.....

Call

Quadram Quad-

modem (Stand alone,

full 212A, compatible

w/ Quadlink SW) \$529

US Robotics

Auto-Dial 300/1200 ... \$459

S-100 Modem..... 349

Password..... 325

Vental

300-1200 baud Modem

w/ Crosstalk for

portables..... \$459

PLOTTERS

Amdel

DXY-100..... \$599

Amplot II..... 899

Enter

Sweet P Six Shooter... Call

Houston Instruments Call

MISC.

Alpha-Delta

MACC/B-slot Surge

Protector \$ 69

Computer Accessories

Power Director..... Call

Electronic Protection

Devices

Lemon / EC-I..... \$ 38

Lime / EC-II..... 55

Orange / EC-IV..... 75

Flip'n' File 5 1/4" \$ 22

Hauptpage

8087 Chip \$159

Other Products..... Call

Kensington Microware

Masterpiece..... \$109

Key Tronic

KB 5150..... \$169

KB 5151..... 175

KB 5151 Dvorak..... 175

Microsoft Mouse.....

\$155

Mouse Systems

PC Mouse..... \$159

RH Electronics, Inc.

Guardian Angel (200

watt uninterruptable

power source)..... Call

Power Angel (800w).... Call

Titan Technologies, Inc.

PC Accelerator..... Call

TG Joystick.....

\$ 49

Touchstone Technology

Touchstone I (add-on

keypad for the IBM) . \$169

Versa Computing

VersaWriter..... \$239

For assistance in determining your needs, use our technical line? We will be happy to provide full support.

POLICY:

- ▶ Wisconsin residents add 5% for sales tax.
- ▶ Minimum \$4.00 for shipping, handling and insurance for orders to \$200.
- ▶ For orders over \$200, add 2 1/2% for shipping, handling and insurance.
- ▶ For cash prepayment of orders \$200 or more, add ONLY 2% for shipping, handling and insurance.
- ▶ Foreign — either add 15% handling & shipping (Int'l money order) or inquire.
- ▶ Prices are subject to market fluctuations.
- ▶ All items subject to availability.

WE WELCOME:

- ▶ Visa, MasterCard and American Express. (No charge for credit cards.)
- ▶ Corporate, government or educational volume purchases, please ask for special accounts desk for additional discount. (1-715-848-1374)
- ▶ COD (Add \$2.00 per box/parcel. Cash or certified check required.)
- ▶ Checks. (Allow 1-2 weeks for clearing.)

WORKING HOURS:

Monday-Friday 8:30-6:00 • Saturday 10:00-2:00 (Ordering Lines only) • Central Time

For tech. support, order status and customer service, call (715) 848-1374 (M-F, 8 am to 5 pm)

CIRCLE 363 ON READER SERVICE CARD FOR SPECIALS OF THE MONTH

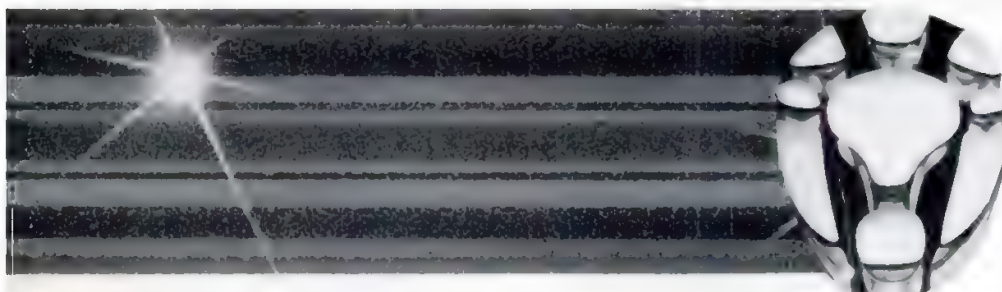
CIRCLE 351 ON READER SERVICE CARD

ORYX SYSTEMS, INC.
CRAFTSMEN OF THE NEW TECHNOLOGY

1 800 826-1589

WITHIN WISCONSIN **1 800 472-3535**

425 First Street • P.O. Box 1961
Wausau, Wisconsin 54401
INT'L TELEX: 260181 ORYX SYS WAU



PROGRAMMING

```

BAD_MSG1      db      ' . . NOT REDirected . . $'
BAD_MSG2      db      ' . . already exists$'
END_LINE      db      10,13,'$'

;
CODE_START:    ; Parse command line into source & target parameters
mov            dx,offset COPYRIGHT      ; Display copyright notice
mov            ah,9h
int            21h
mov            ah,30h                  ; Get PC-DOS Version
int            21h
mov            PC_DOS_VER,al
mov            si,80h                  ; PSP parameter byte count pointer
mov            cl,[si]                 ; Move byte count to CL
xor            ch,ch                   ; Zero CH
jcxz           NO_PARAMS_PASSED        ; If CX is zero, there are no parameters
mov            dx,cx                   ; Save byte count in dx
inc            si                      ; Point to parameter area
mov            di,si                   ; Copy SI to DI for cleanup routine
cld                                     ; Set direction flag to forward
CLEAN_PARAMS:  ; Change valid delimiters to blanks, lower to upper case
lodsb         ; Load each character to AL
push          di                      ; Save DI on stack
mov            di,offset VALID_IN      ; Point to table of valid inputs
push          cx                      ; Save CX on stack
mov            cx,VALID_NUM            ; Set CX to number of inputs to look for
repne         scasb                   ; See if any are in AL
jcxz           CLEAN_END               ; If not, change nothing
mov            bx,VALID_NUM            ; Set up BX to point to valid output
sub            bx,cx                   ; This will leave BX one off
mov            al,VALID_OUT [bx - 1]   ; Load the valid output to AL
CLEAN_END:
pop            cx                      ; Restore CX
pop            di                      ; Restore DI
stosb         ; Store modified AL back to PSP
loop          CLEAN_PARAMS            ; Loop until CX is zero
;
mov            cx,dx                   ; Restore number of bytes in PSP to CX
mov            dx,2                    ; Set DX to look for up to 2 parameters
mov            bx,offset SOURCE_FILE   ; Set BX to address of 1st parameter
mov            al,' '                  ; Set up to scan for first non-blank
mov            di,81h                  ; Set DI to PC-DOS parameter pointer
FIND_PARAMS:  ; Start looking for parameters, load to program storage
repe          scasb                   ; Scan while blanks
mov            si,di                   ; Set SI to second non-blank byte
dec            si                      ; Adjust it to first non-blank byte
inc            cx                      ; Adjust CX to compensate
jcxz           PARAMS_LOADED           ; If CX is zero, no parameters left
mov            di,bx                   ; Set DI to parameter hold area
mov            ax,cx                   ; Store CX to first byte of hold area
stosb         ; DI is adjusted to second byte here
STORE:        lodsb                   ; Load each byte to AL
cmp            al,' '                  ; Is it a blank?
jz             END_STORE               ; Yes, end of this parameter
stosb         ; No, store the byte to hold area
END_STORE:
loopnz        STORE                   ; Keep looking
sub            [bx],cx                 ; Store number of bytes in each

```

(Figure 1 continues)

PROGRAMMING

```

        jcxz    PARMS_LOADED      ; If CX is zero, no more parameters
        dec     byte ptr [bx]    ; parameter to first byte of hold area
        mov     di,si            ; Set up to scan for next non-blank
        dec     di               ; Adjust DI to point to the blank
        inc     cx               ; Adjust CX to compensate
        dec     dx               ; Decrement DX counter
        cmp     dx,0             ; Is DX zero?
        jz      PARMS_LOADED     ; Yes, all expected parameters loaded
        add     bx,PATH_FILE_LEN ; No, point to next part of hold area
        jmp     FIND_PARMS       ; Go back and look for more
PARMS_LOADED:                    ; All parameters are loaded
        cmp     SOURCE_FILE[0],0 ; If there are no bytes in the
        ja      FIX_UP           ; SOURCE_FILE, no parameters present
NO_PARMS_PASSED:                ; Exit with an error if there
        mov     dx,offset NO_PARMS ; are no parameters passed
        jmp     ERROR_EXIT
FIX_UP:                          ; Fix SOURCE_FILE and TARGET_PATH
RED_MSG proc near                ; Display message for each file
        mov     cx,2             ; 2 fields - source & target file
        mov     bx,offset SOURCE_FILE + 1 ; Point to source file
START1: mov     si,bx            ; Copy BX to SI
START2: lodsb                    ; Load each byte to AL
        cmp     al,0             ; If ASCII 0, end of field
        je      BETWEEN
        mov     dl,al            ; Copy byte to DL for function 2H
        mov     ah,2h            ; Request function 2H
        int     21h             ; Call PC-DOS
        jmp     START2          ; Get next character
BETWEEN: cmp     cx,2            ; Is it first or second field?
        jne     CR_LF           ; If second, display end of message
        cmp     ERR_FLAG,0       ; Is this a success message?
        jz      OK1             ; Yes, go use GOOD_MSG
        mov     dx, offset BAD_MSG1 ; No, display first part of BAD_MSG
        mov     ah,9h            ; Request function 9H
        int     21h             ; Call PC-DOS
        jmp     NEXT            ; Go process next field
OK1:   mov     dx,offset GOOD_MSG ; Display GOOD_MSG
        mov     ah,9h            ; Request function 9H
        int     21h             ; Call PC-DOS
        jmp     NEXT            ; Go process next field
CR_LF:  cmp     ERR_FLAG,0       ; Is this a success message?
        jz      OK2             ; Yes, go terminate message
        mov     dx,offset BAD_MSG2 ; No, display second part of BAD_MSG
        mov     ah,9h            ; Request function 9H
        int     21h             ; Call PC-DOS
PC_DOS_2: ; Patch for incorrect error
        cmp     PC_DOS_VER,3     ; return in PC-DOS 2.0 and 2.1
        jae     OK2
        mov     dx,offset PC_DOS_2_PATCH
        mov     ah,9h
        int     21h
        mov     dx,offset PATH_NOT_FOUND
        int     21h
OK2:   mov     dx,offset END_LINE ; Terminate display line
        mov     ah,9h            ; Request function 9H
        int     21h             ; Call PC-DOS
NEXT:  add     bx,PATH_FILE_LEN  ; Move BX to point to next field

```

(Figure 1 continues)

PROGRAMMING

```

        loop    START1                ; Loop for second field
        ret                                ; Or end and return to callint point
RED_MSG  endp
RED      ends
        end
        mov     di,SOURCE_END          ; DI points to end of source path
        mov     si,9eh                 ; SI points to default DTA in PSP
        mov     cx,13                 ; DTA will have 13 bytes
rep      movsb                          ; Move bytes to SOURCE_FILE
        mov     di,TARGET_END          ; DI points to end of target path
        mov     si,9eh                 ; SI points to default DTA in PSP
        mov     cx,13                 ; DTA will have 13 bytes
rep      movsb                          ; Move bytes to TARGET_PATH
;
        mov     dx,offset SOURCE_FILE + 1 ; DX points to old file name
        mov     di,offset TARGET_PATH + 1 ; DI points to new file name
        mov     ah,56h                 ; Request function 56H (rename file)
        int     21h                   ; Call PC-DOS
        jnc     GOOD_RED               ; If no error, call was successful
        cmp     ax,3                   ; Check for error 3 (path not found)
        jne     ERR_5
        mov     dx,offset PATH_NOT_FOUND
        jmp     ERROR_EXIT             ; Exit program with error message
ERR_5:   cmp     ax,5                   ; Check for error 5 (file inaccessible)
        jne     ERR_17
        mov     ERR_FLAG,1             ; Soft error -
        call    RED_MSG                ; Issue message with subroutine
        jmp     NEXT_FILE              ; and keep going
ERR_17:  cmp     ax,17                  ; Check for error 17 (drive conflict)
        jne     UNDEF
        mov     dx,offset DRIVES_CONFLICT
        jmp     ERROR_EXIT             ; Exit program with error message
UNDEF:   mov     dx,offset UNDEFINED_ERR ; Undefined error from function 56H
        jmp     ERROR_EXIT             ; Exit program with error message
GOOD_RED:
        mov     ERR_FLAG,0             ; Set error flag off and
        call    RED_MSG                ; issue message with subroutine
NEXT_FILE:
        mov     ah,4fh                 ; Look for next file
        mov     cx,0
        int     21h                   ; Request function 4FH (find next file)
        jnc     FOUND_ANOTHER          ; No error, another file was found
        jmp     END_OK                 ; Error, we're done finding files
FOUND_ANOTHER:
        jmp     FOUND_FILE              ; Go process next file
END_OK:  int     20h                   ; Exit to PC-DOS

ERROR_EXIT:
        push    dx                     ; Print Error Message and Exit
        mov     ah,9                   ; Save error message pointer on stack
        mov     dx,offset ERR_HEAD     ; Display error header
        int     21h
        mov     ah,9                   ; Display error message
        pop     dx
        int     21h
        mov     ah,9                   ; Display error tail
        mov     dx,offset ERR_TAIL

```

(Figure 1 continues)

PROGRAMMING

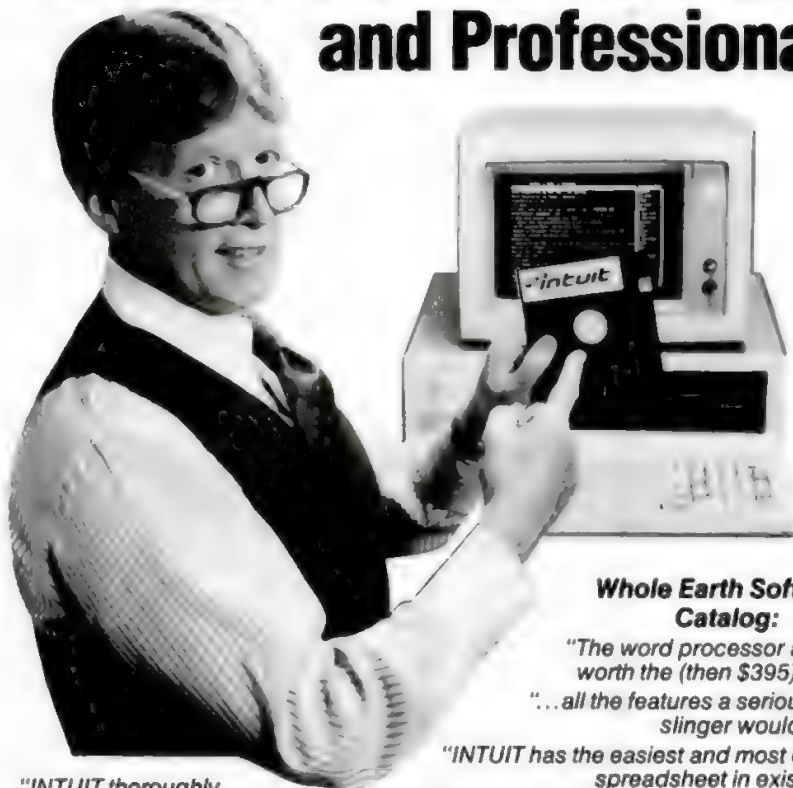
```

int      21h
int      20h                ; Exit to PC-DOS
mov      si,offset SOURCE_FILE ; For Search and Rename calls
lodsb                    ; Get Number of bytes
xor      ah,ah            ; Zero high byte of AX
mov      di,si            ; Move SI to DI for scan
add      di,ax            ; Start scan at end of parameter
dec      di
mov      cx,ax            ; Set CX to number of bytes
mov      al,'\'          ; Scan for the last '\'
repnz    scasb            ; Set direction flag to reverse
jnz      NO_SOURCE_DIR    ; Scan while not '\'
add      di,2            ; If Zero Flag not set, '\' not found
jmp      SOURCE_FIXED     ; Add 2 to DI to point to file name
NO_SOURCE_DIR:           ; position
add      di,1            ; No source directory was specified
cmp      SOURCE_FILE[2],':' ; Adjust DI
jne      SOURCE_FIXED     ; Check for specified disk drive
mov      di,offset SOURCE_FILE[3] ; None present, we're done
SOURCE_FIXED:           ; Yes, set DI to point to first byte
mov      SOURCE_END,di    ; after ':'
;                        ; Move DI to SOURCE_END pointer
;
cld                                ; Set direction flag to forward
mov      si,offset TARGET_PATH ; Set up to look for '\' present
lodsb                    ; Get number of bytes
cmp      al,0            ; If it's zero, no target specified
je       NO_TARGET
xor      ah,ah            ; Zero high byte of AX
add      si,ax            ; Add it to SI to point to end
dec      si              ; Decrement SI to adjust
lodsb                    ; Look at last byte
mov      di,si           ; Copy SI to DI
cmp      al,'\'          ; Is last byte a '\'?
je       TARGET_FIXED     ; Yes, everything's fine
cmp      TARGET_PATH[0],2 ; If TARGET_PATH is 2 bytes long and
jne      STORE_SLASH      ; is a disk drive specification,
cmp      TARGET_PATH[2],':' ; let it default to the current
je       TARGET_FIXED     ; directory.
STORE_SLASH:           ; Place a '\' at the end of
mov      al,'\'          ; TARGET_PATH if user did
stosb                    ; not
TARGET_FIXED:           ; Move DI to TARGET_END pointer
mov      TARGET_END,di
jmp      FIND_FILE
NO_TARGET:           ; Set up to allow target path default
mov      TARGET_END,offset TARGET_PATH + 1 ; to current path
FIND_FILE:
mov      dx,offset SOURCE_FILE + 1 ; DX points to SOURCE_FILE
mov      ah,4eh           ; Request function 4EH (find 1st file)
mov      cx,0            ; Set CX to zero for normal files only
int      21h            ; Call PC-DOS
jnc      FOUND_FILE      ; If no error, first file found
mov      dx,offset FILE_NOT_FOUND ; If no files found, exit
jmp      ERROR_EXIT      ; program with error message
FOUND_FILE:

```

(Figure 1 ends)

Here's what the experts say about INTUIT Integrated Software for Small Business and Professionals



Whole Earth Software Catalog:

"The word processor alone is worth the (then \$395) price."
"...all the features a serious word slinger would want."

"INTUIT has the easiest and most elegant spreadsheet in existence."

"INTUIT thoroughly integrates word processing, spreadsheets, and file management."

"...learn to use it in about fifteen minutes." "We recommend INTUIT for large documents. Its automatic outline structuring is perfect for research reports and documentation writing."

"You can zing and zap data back and forth among files, cut and paste, and hop from one activity to another with great agility."

"...Unique system... no menus or complicated commands... extremely powerful and simple to use."

InfoWorld, Oct. 8, 1984 Review:

"...second generation... integrated software... multifeatured package..."

"INTUIT generally lives up to its advertising as a 'full-function productivity tool.'"

"INTUIT's heart is its file- and record-management capabilities. The program outshines many others..."

"Coupled with first-rate on-line documentation is a very good telephone technical support group." "...The program is well-protected against user mistakes..."

User Clyde Elliot, VP, InterTech Marketing, Fullerton, CA:

"If Lotus 1-2-3 is worth \$495, then INTUIT is certainly worth \$695."

Popular Computing, October 1984:

"For an easy-to-use spreadsheet, look at INTUIT."

Get INTUIT. We think you'll agree with the experts. And it's now offered at the **\$89⁹⁵** ASTOUNDING NEW LOW PRICE OF...

INTUIT is supplied with Directory and File Management, Full-Function Word Processing, Data Base, Forms, Report Generation, Mail Merge, Spreadsheet, and 4-Function Calculator. A Bookkeeping Module is optional. Ten command keys control all functions. Complete system level integration allows the free movement of data between files. The Spreadsheet works in plain English with up to 67 character phrases for file names. Use INTUIT with the IBM PC, XT, and most compatibles. 256K, DS/DD Floppy required.

See your local dealer or order direct. Prepaid or COD only. Phone orders accepted. Add \$5.00 shipping/handling. Calif. add \$5.85 tax. Bookkeeping Module, add \$20.00 plus (Calif. only) \$1.30 tax.



NOUMENON CORP. • 512 Westline Dr. • Alameda, CA 94501 • (415) 521-2145

PROGRAMMING

SOURCE_END and TARGET_END pointers calculated in the previous section of REDirect. Unless an error occurs, the program will return here for every file found.

The next PC-DOS function call used is 56H, which is the key to accomplishing REDirect's purpose. Function 56H can

To make REDirect work, you have to assemble it using IBM's PC Assembler and then link it.

rename a file at any level of its path and/or filename. REDirect uses it to rename only the *path* associated with the file, not the filename itself. As a result, all function 56H must do is to copy the file's directory entry from the source directory to the target directory and then delete it from the source directory.

Function 56H is executed by moving a pointer for the current filename (which is stored in an ASCII string) to the DX register, moving a pointer for the new name (again in an ASCII string) into the DI register, and then calling interrupt 21H. If, on returning from Interrupt 21H, the carry flag is not set the rename was successful, and REDirect jumps to GOOD_RED, where the subroutine RED_MSG is called to tell you the good news.

If the carry flag comes back set, the rename failed. There are three documented reasons for such a failure. If the return code (which is found in the AX register) is 3, the target path specified was not found. In PC-DOS 3.0 this usually means that the target directory does not exist, so REDirect terminates the program by jumping to ERROR_EXIT with DX pointing to the "Path not found" error message.

However, PC-DOS 2.0 and 2.1 do not seem to return this error code when the target directory does not exist. Instead,

PROGRAMMING

those versions of PC-DOS return error code 5, which indicates that the target file was "inaccessible". In PC-DOS 3.0, this error actually means that the file already exists in the target directory, and REDirect calls RED_MSG to tell you that the indicated file was not redirected. There is a patch (admittedly ad hoc) in the RED_MSG subroutine that modifies this message if PC-DOS 2.0 or 2.1 is running and error code 5 turns up.

The last documented source of error occurs if the source and target disk drives are not the same (error code 17). REDirect treats this as a fatal error and terminates the program. If an unexpected return code comes back from using function 56H, REDirect exits with an appropriate message.

After each file has been REDirected, REDirect uses function 4FH to see if another file also matches the source file specification. Function 4EH leaves enough data in the DTA to require no information when function 4FH is called. If the carry flag is set, no further files were found, so REDirect terminates. If not, REDirect jumps back to FOUND_FILE to process the next file.

Up and Running

That's all there is to it. To make REDirect work, you have to assemble it using IBM's PC Assembler (ASM, MASM, or Release 2 will do fine) then link it using the PC-DOS linker. REDirect is designed as a .COM file, so it has to be converted from .EXE format to .COM format using EXE2BIN. Unfortunately, REDirect is too long to be created using the DEBUG assembler or even a BASIC program. [Editor's Note: If you haven't got the IBM Assembler, be patient. PC's published programs will soon be available on a bulletin board for downloading.]

When you've got a version of REDirect running, test it on scratch floppy disks. It's only too easy to insert an error in such a long program, and there's no point risking the integrity of your hard disk while testing your new command. ■

Business as Usual?

Business as usual these days means a computer that's up and "humming." But if your computer were stolen or damaged, you wouldn't have business as usual.

YOU'D HAVE TROUBLE!

You can get fast replacement for your entire system and be back in business in a hurry by protecting your computer with SAFEWARE Personal Computer Insurance. It's the only coverage designed specifically for personal computers used for business — in your office, shop or home.

SAFEWARE protects ALL hardware, ALL purchased software and ALL media against theft, accidental damage, natural disaster, power surge, etc., regardless of use, after a low \$50 deductible.

(Not without your computer it wouldn't be.)

Fast, courteous claims handling prevents your losing valuable business computing time.

Find the premium price for the coverage you need listed in the table below, available for as low as \$35 per year. Fill in the coupon today. Your coverage will begin as soon as your payment is accepted. Or, for even faster coverage, call our toll-free number.

1-800-848-3469

(In Ohio call 1-614/262-0559)

Phones open 8 a.m. to 8 p.m.
Monday through Saturday



Total Hardware, Media & Software System Value	Annual Premium
Up to \$ 2,000	\$ 35
\$ 2,001-\$ 5,000	\$ 60
\$ 5,001-\$ 8,000	\$ 75
\$ 8,001-\$11,000	\$ 90
\$11,001-\$14,000	\$105

Call toll-free for rates on higher coverage
Coverage differs in Texas
It is an underwriting requirement that you
insure your system for its full value
Call for student rates

Mail to: SAFEWARE, P.O. Box 02211, Columbus, OH 43202

Before I'm out of business,

please issue my SAFEWARE Insurance Coverage

Name _____

Street _____

City _____ State _____ Zip _____

System value \$ _____ ☐ Check Enclosed ☐ VISA ☐ MasterCard

Card # _____ Exp. Date _____

Signature _____

No risk. You may return contract for full refund within 10 days. Coverages and limits are subject to the terms, conditions and exclusions in the contract.

PCM

4,000 Programmers depend on us to find, compare, evaluate products and for solid value.

ARTIFICIAL INTELLIGENCE

EXSYS - Expert System building tool. Full RAM, Probability, Why, Intriguing, serious. PCDOS \$295

GC LISP - "COMMON LISP", Help, tutorial, co-routines, compiled functions, thorough. PCDOS \$475

PROLOG-86 - Learn fast, Standard, tutorials, samples of Natural Language, Exp. Sys. MSDOS \$125

Other solid alternatives include:

IQ LISP (\$155), MuLISP-86 (\$250), WALTZ LISP for CPM (\$159), MicroPROLOG (\$275).

C PROGRAMMING

INSTANT C - Interactive development - Edit, Source Debug, run. Edit to Run - 3 Secs. MSDOS \$500

"INTRODUCING C" - Interactive C to learn fast. 500 page tutorial, examples, graphics. PCDOS \$95

SUPPORT PRODUCTS

BRIEF Programmer's Editor - undo, windows, reconfigurable, macro programs, powerful. PCDOS \$195

PERISCOPE DEBUGGER - load after "bombs", symbolic. PCDOS \$295

Call for a Catalog, literature on any product or a free literature "Packet" on: "AI", BASIC, C, COBOL, Debuggers, Editors, FORTH, FORTRAN, Libraries, PASCAL

CALL TOLL FREE 800-421-8006

THE PROGRAMMER'S SHOP™

The programmer's complete source for software, services and answers

128-S Rockland Street, Hanover, MA 02339 In Mass.: 800-442-8070 or 617-826-7531

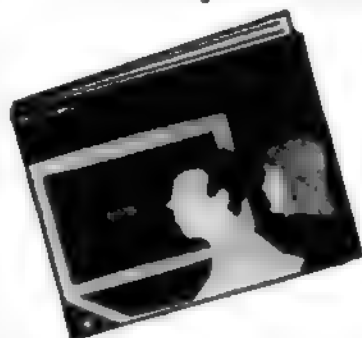
CIRCLE 391 ON READER SERVICE CARD

How to teach your kids about the IBM PC.

Computers for Kids teaches children age 8 and older to write their own programs in less than an hour—without the necessity for previous knowledge of algebra, variables, or computers. And there's a special section that keeps parents and teachers on the same successful command path.

Starting off with an easy-to-understand explanation of how to use the IBM PC, your kids will progress quickly to flow charts and simple print programs...to loops, graphics, and other programming concepts that show the young user how to make the PC do exactly what he wants—in non-technical language that makes life easier for both of you.

So do your children a favor.



Do yourself a favor. Order the PC edition of *Computers for Kids* today!

Creative Computing Press

Dept. FE3C 39 East Hanover Avenue
Morris Plains, NJ 07950

Send me _____ *Computers for Kids*, PC edition, at \$5.95 plus \$1.50 postage and handling each. #12K

☐ **PAYMENT ENCLOSED \$** _____
Residents of CA, NJ and NY State add applicable sales tax. Outside USA add \$3.00 per order.

☐ **CHARGE MY:** (Charge and phone order \$10 minimum)
☐ American Express
☐ MasterCard ☐ Visa

Card No. _____ Exp. Date _____

Signature _____

Mr./Mrs./Ms. _____
(please print full name)

Address _____ Apt. _____

City _____

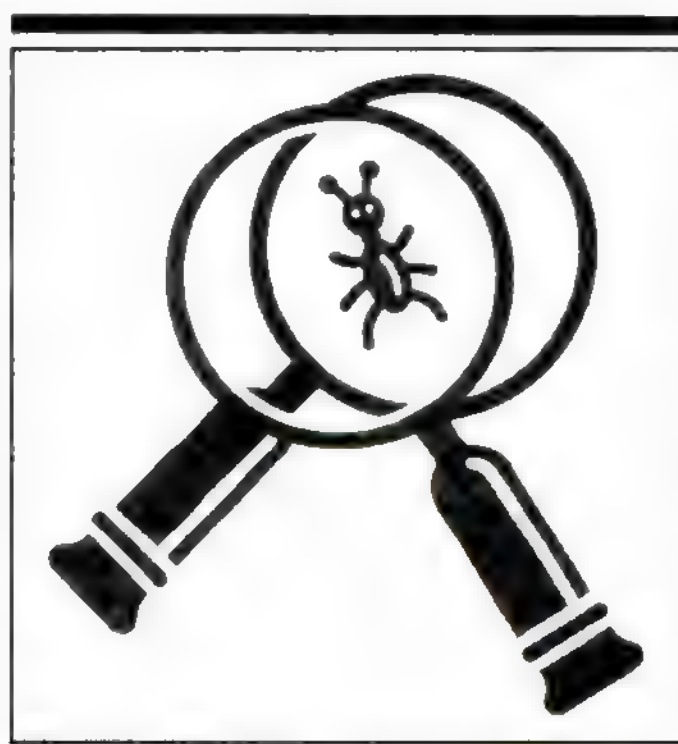
State/Zip _____

☐ Send me a FREE *Creative Computing Catalog*.

EDITED BY PAUL SOMERSON

User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.



Screen FLIPper

Are you ever forced to copy information from your screen before it scrolls off into the ozone? There's a simple solution: if you have a color/graphics card you can use one of its "underexploited" video pages as a scratch pad. The short assembly language listing in Figure 1 creates a program called FLIP.COM that allows you to flip between two video pages while working from DOS 2.x. I find this especially useful while compiling programs. By getting a directory of my work disk on one page and then flipping to the other page to compile and link, I always have a list of my files handy for reference.

FLIP.COM switches the active page back and forth between 0 and 1 by making calls to the BIOS. By controlling the cur-

sor location, it also ensures that the screens are not scrolled as you flip back and forth between them. The cursor changes to a block shape in page 1 so you always know which page you are using; you need to know which page is active since the PC's alternate video pages are completely ignored by most screen-oriented programs, such as *WordStar*. Many of these programs write to the standard page (0) without bothering to check which page is actually being displayed. Be sure that the normal (2-line) cursor is displayed before calling such a program.

While I named the program FLIP.COM, you might want to rename it to something shorter. Since it takes up only 62 bytes, it's convenient to put it in a RAMdisk with AUTOEXEC.BAT and just leave it there.

K. Scott Hunziker
Cambridge, Mass.

It is a pity that most programs ignore the PC's paging feature, since there is always 16K available on the color/graphics display card, and since an 80-column text screen takes up only 4K. Applications could load in help screens, for instance, and switch back and forth between them and the main screen in an instant. Or programs could park themselves, flip to an alternate page, and do various DOS chores without disturbing the image on the

USER-TO-USER

```

code_seg      segment
               assume cs:code_seg
begin:         org 100h
               mov ah,15      ; read video state (call to BIOS)
               int 10h
               and bh,1        ; make sure we deal only with 0 or 1
               xor bh,1        ; switch to other page
               mov bl,bh       ; save new page number
               mov al,bh       ; set new active page (call to BIOS)
               mov ah,5
               int 10h
               mov dh,22       ; set cursor to row 22
               mov dl,0        ; and column 0
               mov ah,2        ; set cursor position (call to BIOS)
               int 10h
               mov ch,6        ; assume page 0, begin cursor at 6
               mov cl,7        ; end cursor at line 7
               or bh,bh        ; check new page number
               jz is_zero      ; if new page is 0, we guessed right
is_zero:       mov ch,0        ; cursor begins at line 0
               mov ah,1        ; set cursor type (call to BIOS)
               int 10h
               mov ch,23       ; set upper left of window to row 23
               mov cl,0        ; and column 0
               mov dh,24       ; set lower right of window to row 24
               mov dl,79       ; and column 79
               mov al,0        ; blank the window
               mov bh,7        ; use white on black
               mov ah,6        ; perform window scroll (call to BIOS)
               int 10h
               mov al,bl       ; supply new page number as return code
               mov ah,4ch       ; exit to DOS
               int 21h
code_seg      ends
               end begin

```

Figure 1: Assembly listing for FLIP.COM screen-page flipper.

```

100 'FLIP.BAS -- K. S. Hunziker -- creates FLIP.COM
110 FOR I=1 TO 62:READ J0:H=VAL("&H"+J0):S=S+H:NEXT
120 IF S=6822 THEN 140
130 PRINT "Check your DATA statements and restart.":END
140 RESTORE
150 OPEN "FLIP.COM" FOR OUTPUT AS #1
160 FOR I=1 TO 62:
170 READ J0:H=VAL("&H"+J0):PRINT #1,CHR$(H);
180 NEXT
190 CLOSE:PRINT "FLIP.COM created"
200 END
210 DATA B4,0F,CD,10,80,E7,01,80,F7,01,8A,DF,8A,C7,B4,05
220 DATA CD,10,B6,16,B2,00,B4,02,CD,10,B5,06,B1,07,0A,FF
230 DATA 74,02,B5,00,B4,01,CD,10,B5,17,B1,00,B6,18,B2,4F
240 DATA B0,00,B7,07,B4,06,CD,10,8A,C3,B4,4C,CD,21

```

Figure 2: BASIC FLIP.BAS program that creates the FLIP.COM screen-page flipper. First run this program to create the file. Then, each time you type FLIP the screen will switch from active page 0 to active page 1 or vice versa.

main screen, giving you a full-screen DOS window at all times.

Fortunately, BASIC allows screen paging (on the color/graphics card in text mode) with the statement

```
SCREEN , , A, V
```

where A is the active page (the one the

program writes to) and V is the visual page (the one the program displays). The active and visual pages can be the same, but it's a neat trick to write to a different page from the one currently being displayed. Then when the user or the program switches visual pages, the new page pops impressively into view in an instant.



Do you spend 4 hours or more each day at your word processor?

NOW YOU CAN SAVE

45 MINUTES EACH DAY!

...Just By Switching To The Fastest Word Processing Software: XyWrite II PLUS.

XyWrite II PLUS is lightning-fast! Won't keep you waiting. Ideal for the serious word processing job or the professional writer. Thousands of satisfied XyWrite II PLUS users now enjoy the hours and days they save each month.

Time is money! The \$295 you invest in XyWrite II PLUS will be repaid in 3 months of time saved. Order now! XyWrite II PLUS requires the IBM PC, XT, AT, or compatible hardware, with 192K memory.

Order XyWrite II PLUS directly from us, the authors, or call



for a dealer near you. We wrote it, we support it after the sale. That's the best support you can get!



Call now: John Hild or David Erickson, at (617) 275-4439.

XyQuest Inc.

P.O. Box 372 Bedford, MA 01730
(617) 275-4439

SHELF CONSCIOUS?

Now you can organize your copies of
PC MAGAZINE

Now your magazines can be a handsome addition to your decor, well organized, and easy to find, thanks to these durable library-quality cases or binders. They're made of luxury-look leatherette over high-quality binder board. And both styles are custom-designed for this or any other magazine you save, with size, color and imprint selected by the publisher. FREE transfer foil included for marking dates and volumes.



Magazine binders

holds your issues on individual snap-in rods, combining them into one volume \$7.95 each; 3 for \$22.50; 6 for \$42.50. Mixed titles OK for quantity prices



Open-back cases

store your issues for individual retrieval \$6.95 each; 3 for \$19.75; 6 for \$37.50. Mixed titles OK for quantity prices



For faster service,
CALL TOLL-FREE
800-526-0790
(In NJ only 201-540-0445)

PC Magazine

P.O. Box 5120, Philadelphia, PA 19141

Please send ☐ Cases ☐ Binders

TITLE _____ QUANTITY _____

PC Magazine _____

Other _____

☐ PAYMENT ENCLOSED \$_____ * Add \$1.00 per order for postage and handling. Outside USA add \$2.50 per unit ordered, send US funds only.

☐ CHARGE (Minimum \$10)
☐ American Express ☐ MasterCard
☐ Visa

Card No. _____ Exp. Date _____

Signature _____

Print Name _____

Address _____

City _____

State/Zip _____

*Residents of PA add 6% sales tax

USER-TO-USER

BASIC lets you use up to four different simultaneous pages in 80-width text mode, and up to eight in 40-width text mode.

If you don't have the BASIC assembler, you can create FLIP.COM by running the FLIP.BAS program in Figure 2. FLIP.COM is handy, but do be careful not to run programs like WordStar while in a nonzero screen.

WordStar Printer Patch

Many WordStar users have two printers—a dot matrix printer for speed and an impact printer for letter quality output. In the past it wasn't easy to switch from one printer to the other without manually moving the printer cable back and forth. However, by changing two bytes in WS.COM

```
A>debug ws2.com
-e 7d0 1
-e 7e6 1
-w
Writing 5380 bytes
-q
```

Figure 3: Instructions for changing WordStar so it sends output to LPT2: rather than LPT1: . Type in everything underlined. Then start WordStar by typing WS2 rather than just WS. Before you try this, copy your WS.COM file to one named WS2.COM. Never patch your original WS.COM.

with DEBUG, WordStar users with two parallel printer ports (LPT1: and LPT2:) can send output that would ordinarily go to LPT1: to LPT2: instead. To make the change, type in everything underlined in Figure 3. To change back to LPT1:, substitute 0s for 1s in the lines that begin with *e*. It's best to keep two versions of WordStar, one that sends output to LPT1: and the other to LPT2:.

Marco Papa
Los Angeles, Calif.

If you do this, first make a copy of WS.COM called WS2.COM, then make the indicated changes on WS2.COM. To print on LPT1: use your normal WS file; to

send the output to LPT2: use WS2 instead. It's unfortunate that you'll have to keep two 21K files that vary only by two bytes, but space these days is cheap.

DIR for Directories

The root directory of my PC-XT contains a great many files in addition to my numerous directories. It would be useful to be able to get a listing of the directories only, so I could browse through the list when I can't remember which directory contains a certain file.

A colleague suggested that I give all directories an extension, such as .DIR or .D, which would let me list all my directories by typing

```
DIR *.DIR
```

or

```
DIR *.D
```

However, there is a better way. The command DIR *. will list all the directory names, as well as any files that have no extension. Since I have few of the latter, it is easy enough to separate the directories by eye.

J. B. Sladen
Memphis, Tenn.

In DOS 2.1, you can get a list of all files without extensions by typing in

```
DIR.
```

Since most people don't add extensions to their directories, this method will produce a list of all directories (as well as all filenames without extensions). However, in DOS 3.0, this won't work; instead you have to type

```
DIR *.
```

The best way to organize your hard disk, in our opinion, is to put no files on your root directory except for the three that you absolutely need. You have to put COMMAND.COM on your hard disk if you want to boot off it rather than a floppy. (Your two other system files, IBMDOS.COM and IBMBIOS.COM, will also

USER-TO-USER

be in your root directory, but you won't see them because DOS marks these as "hidden" from normal directory searches.)

It's undoubtedly a good idea to add an AUTOEXEC.BAT file to start the ball rolling each time you turn your computer on. And on any hard disk you should also have a CONFIG.SYS file that specifies the number of buffers DOS will allocate. Peter Norton (in *The Norton Chronicles*, PC, Volume 3 Number 25) suggests BUFFERS=16 for a 10-MB PC-XT and BUFFERS=32 for a 20-MB PC AT. CONFIG.SYS can also tell DOS such other important things as how frequently to check for the Ctrl-Break keystroke combination or what device drivers (such as ANSI.SYS) to load.

But aside from these three, you really don't need to put anything else on your root directory—except the names of your main subdirectories, of course. If you organize your hard disk this way, you can get a list of all your subdirectories just by typing DIR. If it really bothers you to see the three files mentioned above, type in DIR *. (and be sure your directories don't themselves have any extensions—they don't need them).

If you do this, you'll probably want to PATH to important overlays and files buried inside various subdirectories. The DOS 2.x and 3.0 PATH command won't look for anything except .COM, .EXE, and .BAT files, although it is rumored that IBM widened the search to include non-executable files in versions later than 3.0. Until then, you can buy one of the many extended-PATH utilities on the market that will do this for you.

Yet Another WordStar Fix

Ever since WordStar's first release for the PC, devoted users have complained about the goofy way it makes the Del key do what the backspace key should do and the backspace duplicate the function of the left arrow key. I supplied the patch for the former in these pages many moons ago, but the latter eluded me. Until now.

You don't have to buy the abysmally disappointing WordStar 2000 or even a keyboard enhancer to correct the problem. Just put a spare copy of WS.COM in drive B: and a copy of DEBUG.COM in drive A: At the A> prompt, type DEBUG B:WS.COM. At the hyphen prompt, enter

E 49B

0D should be displayed. Type in AE and hit the spacebar. 7E should be displayed. Type in 83 and hit the Enter key. Then enter

E 6E6

You should see 08 displayed. Type in 13 and hit the Enter key. You've now got a destructive backspace where it should be. To fix the delete key, enter

e 71C

The screen should show 7F. Type in 07 and hit the Enter key. Then type W and hit the Enter key. DEBUG will give you a little message about how many bytes it's writing to disk. After that, all you have to do is enter Q for quit, and your WordStar will work like a charm.

Stephen Manes
Riverdale, N.Y.

Finally, a real backspace key in WordStar. This one does work like a charm. It was always easy to get the backspace to become destructive, but it took the left arrow with it. This patch does it right and should make a lot of WordStar users awfully happy.

Share Your Discoveries

Tell the world about your latest discovery through User-To-User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout of your submission to ensure against damage in transit. Mail your contributions to: User-To-User, PC Magazine, One Park Avenue, New York, NY 10016.

THE DO-IT-YOURSELFERS' PROJECT ASSISTANT

BY TOM & KELDA RILEY

Make your own game controls...repair that old joystick that's been sitting in your closet...have your project assistant in your home, ready to work when you are!

The COMPUTER CONTROLLER COOKBOOK gives you complete schematics and mechanical drawings for building and repairing game devices and controls for your Atari® and Apple® computer, with a special section showing you how to adapt these outlines to major machines.

Imagine building your own Super Joystick, Annunciator, Airplane Wheel, Foot Pedals, Sketch Pad or Multiple Connector from purchased and scavenged parts, and then using them on your home computer! You can save up to half the usual retail price, and get up to double the life of most commercially purchased units!

Order the COMPUTER CONTROLLER COOKBOOK today for hours of enjoyment and learning.

Apple is a registered trademark of Apple Inc. Atari is a registered trademark of Atari Inc.



CREATIVE COMPUTING PRESS

Dept. FESC, 39 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ COMPUTER CONTROLLER COOKBOOK(s) at \$12.95* plus \$2.00 postage and handling each. Outside U.S.A. add \$3.00 per order. #8C.

☐ Payment enclosed \$_____. *Residents of CA, NJ, and NY State add applicable sales tax.
☐ Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Signature _____

Mr./Mrs./Ms. _____
please print name in full

Address _____

City _____

State _____ Zip _____

For faster service, PHONE TOLL FREE

1-800-631-8112

(In NJ call 201-540-0445)

☐ Send me a FREE Creative Computing Press Catalog. Also available at your local bookstore or computer store.

PC Tutor



Using Assembler in BASIC

Q: How can I embed assembly language subroutines into my BASIC programs? Similarly, how can I take advantage of the IBM BIOS calls?

*Mark Lewis
Cambridge, Massachusetts*

A: This is a pair of questions I get asked fairly frequently. Let me answer in detail by using a simple example in which you clear a rectangular portion of the screen.

First, you need to create the requisite assembly code. This is most easily done with DEBUG's A command, which facilitates in-line assembly.

By way of illustration, I have produced a general-purpose assembly language BIOS calling routine. All of the IBM BIOS calls are accessible by performing an 8088 INT *nn* call. The IBM video BIOS call is INT 16 (decimal), for example. By setting the 8088 registers, you can access all of the BIOS features except for returning results.

Your first step is to find out the proper syntax by reading the IBM *Technical Reference* manual. A glance at the manual provides the following information about the registers:

AH = 6 scrolls the active window
AL = number of lines to screen
(AL=0 clears the entire window)
(CH,CL) = (row,column) start
(DH,DL) = (row,column) end
BH = attribute to use on blank lines

Through the use of these registers, a simple assembly language subroutine might be created with the debugger, as follows:

```
A>DEBUG
-a100
XXXX:0100 PUSH    BP9
XXXX:0101 MOV     AL,01
XXXX:0103 MOV     AH,01
XXXX:0105 MOV     BL,01
XXXX:0107 MOV     BH,01
XXXX:0109 MOV     CL,01
XXXX:010B MOV     CH,01
XXXX:010D MOV     DL,01
XXXX:010F MOV     DH,01
XXXX:0111 INT     01
XXXX:0113 POP     BP
XXXX:0114 RETF
```

The parameters entered here (all 1's) are arbitrary. Since this program will have no arguments, a RETF (Return Far) is used at the end. The parameters are arbitrary since the BASIC program will be altering them to suit. The RETF at the end of the program should have a number following it equal to 2 times the number of arguments.

To display the machine code (in hex) for this program, type d in response to DEBUG's hyphen prompt. This will produce 2-byte lines of numbers after the addresses, followed by ASCII equivalents, where possible. This display is shown in Figure 1, without the ASCII columns that will appear on the far right side of your screen. To exit from DEBUG, simply type q after the prompt.

The next step is to create the BASIC program, which is listed in Figure 2. Here, I have set up a character string to make the assignments more obvious. Since BASIC stores the address of the string at (varptr+1), you need to first find the VARPTR and then do some PEEKS to find the actual code string address.

By setting the registers (AL,AH,...) and the interrupt number (INTNUMBER) within your main program (lines 140-180), and then calling this as a subroutine, you can access the internals of the PC quite easily. I separated the routine into setup and run sections so that the setup of the BIOS\$ string need to be done only once.

Sequential Syntax

Q: How can I make my BASIC program open a sequential file on drive B: using a name the user enters from the keyboard? On the A: drive this is done with the following statements:

```
10 INPUT "Filename"; N$
20 OPEN N$ FOR OUTPUT AS #1
```

For the B: drive, I've tried the following:

```
10 INPUT "Filename"; N$
20 OPEN "B:N$" FOR OUTPUT AS #1
```

This, however, opens a file on the B: drive and assigns to it the name 'N\$', not the user's entry.

*John W. Haines
Phoenix, Arizona*

A: Since OPEN expects a character string as the filename, to accomplish what you want you just need to create a name that begins with "B:" and ends with the user's desired filename. The following routine will do that:

```
10 INPUT "Filename";N$
20 OPEN "B:"+N$ FOR OUTPUT AS #1
```

Note the use of the plus sign (+) here to produce string concatenation. This lets you make up filenames of any desired complexity, and this is what was missing in your procedure. Under DOS 2.x for example, if you want your files to be put in a specific subdirectory (named DATAFILE in this example), you might use

```
10 INPUT "Filename" ; N$
20 OPEN "B:\DATAFILE\"+N$ FOR OUTPUT
   AS #1
```


This procedure does show up an interesting bug, however. If you try entering

```
FILES "B:\DATAFILE\*.**"
```

you will find that while the files in the

DATAFILE subdirectory will be correctly listed, the listing will also seem to indicate that it is showing your current subdirectory. I have not figured out the reason for this anomaly.

```
-d100
0FB9:0100 55 00 01 B4 01 B3 01 B7-01 B1 01 B5 01 B2 01 B6
0FB9:0110 01 CD 01 5D CB
-q
```

Figure 1: Machine code (in hexadecimal) display of the program created by the DEBUG assembler.

```
100 REM Sample program using BIOS
110 ' by Mark Zachmann
120 GOSUB 1000 : 'Set the BIOS$ string
121 '
130 ' This routine clears a rectangular area
131 ' defined by (CH,CL) and (DH,DL),
140 AH=6 : AL=0 : BH = 7
150 ' In this example, from (5,5) to (20,40)
160 CL = 5 : CH = 5 : DH = 20 : DL = 40
170 ' Use Interrupt 16 - video interrupt
180 INTNUMBER = 16
190 GOSUB 2000 : 'call the BIOS subroutine
200 END
998 '
999 '
1000 REM General Interrupt Calling Routine Setup
1010 DEF SEG
1020 DATA &h55, &hB0, 1, &hB4, 1, &hB3, 1, &hB7
1025 DATA 1, &hB1, 1, &hB5, 1, &hB2, 1, &hB6
1030 DATA 1, &hCD, 1, &h5d, &hCB
1038 ' Make a string large enough for the
1039 ' routine (29 periods, below)
1040 BIOS$="....."+""
1049 ' Initialize the string
1050 RESTORE 1020
1060 FOR I=1 TO 21
1063 READ J : MID$(BIOS$,I,1)=CHR$(J)
1065 NEXT I
1070 RETURN
1998 '
1999 '
2000 DEF SEG : 'REM Set up the string
2005 ' variables (registers)
2010 MID$(BIOS$,3,1) = CHR$(AL)
2020 MID$(BIOS$,5,1) = CHR$(AH)
2030 MID$(BIOS$,7,1) = CHR$(BL)
2040 MID$(BIOS$,9,1) = CHR$(BH)
2050 MID$(BIOS$,11,1) = CHR$(CL)
2060 MID$(BIOS$,13,1) = CHR$(CH)
2070 MID$(BIOS$,15,1) = CHR$(DL)
2080 MID$(BIOS$,17,1) = CHR$(DH)
2090 MID$(BIOS$,19,1) = CHR$(INTNUMBER)
2098 ' Now find out where to call
2099 ' (Note: J! must be a real variable)
2100 I%=VARPTR(BIOS$):J!=PEEK(I%+1)+256*PEEK(I%+2)
2110 IF J!>32767 THEN I% = J!-65536: ELSE I%=J!
2120 CALL I%
2130 RETURN
```

Figure 2: The BASIC program listing for register set-up and Interrupt calling.

Overwriting Insurance

Q: When trying to load a BASIC program on my PCjr, I often hit the function key F4 (SAVE) rather than F3 (LOAD). Since I have keyed in the correct filename, the result is that I simply save a blank program and erase the program I had intended to load.

Professional programs have a safety check that asks the user to verify that a program should be overwritten. Is there any easy way to provide the missing verification protection?

Russ Hoefgen
Eureka, Missouri

A: What I would suggest in your situation is rather that you create a BASIC program that reprograms your functions keys. Your primary problem is that F3 does a LOAD, while F4 does a SAVE. I suggest the following program, which I call SETKEY:

```
10 KEY 4,"SCREEN 0,0,0"+CHR$(13)
20 KEY 10,"SAVE "+CHR$(34)
```

This program exchanges the actions of function keys F4 and F10. Key 4 becomes SCREEN 0,0,0, plus a carriage return, while key 10 becomes the SAVE command (ASCII code 13 is a carriage return, the equivalent of pressing the Return Key; ASCII code 34 is a double quote.) This way your function keys have widely separated functions. Tapping F4 by mistake will only clear the screen, which serves as a good visual cue that you've pressed the wrong key. To save a program with a function key, you will now use F10 instead of using F4.

For simplicity, just get in the habit of calling this key reassignment routine along with BASIC via:

BASIC SETKEY

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016. ■



Spending more time searching for the technology...than using it?

DATA SOURCES systematically organizes all your DP options!

No other resource puts over 20,000 systems and applications software packages...over 17,000 hardware and data communications products...and some 9,000 company profiles instantly at your fingertips.

DATA SOURCES is conveniently indexed to help you locate the products you seek quickly...find others you may not be aware of...and determine their capability and compatibility at a glance. You'll use...

...The Product Index, with its complete listing of every product covered by DATA SOURCES, to lead you to the larger listing quickly.

...The Company Profile Index, to help you identify all the product

areas in which a firm is currently involved easily.

...The Company/Product Index, to find each vendor's full range of products within each equipment category instantly.

...The Software Index, to help you access specific packages, even if you're not sure of the author or product classification.

And DATA SOURCES' handy comparison charts let you review similar products by multiple manufacturers for key criteria, including compatibility and price.

PLUS...in-between quarterly editions, subscribers have access to the exclusive DATA SOURCES HOTLINE for information on product location assistance.

JUST CALL (800) 227-1617 ext 251 TODAY! (In California, call (800) 722-3543 ext. 251)

We'll send your first 2-volume edition on a 30-DAY APPROVAL basis and enter your year's subscription to DATA SOURCES at just \$150...\$60 off the regular cover price...FOR 4 quarterly editions.



DATA SOURCES

Leading the Industry in Information Management

P.O. Box 5845, Cherry Hill, N.J. 08034

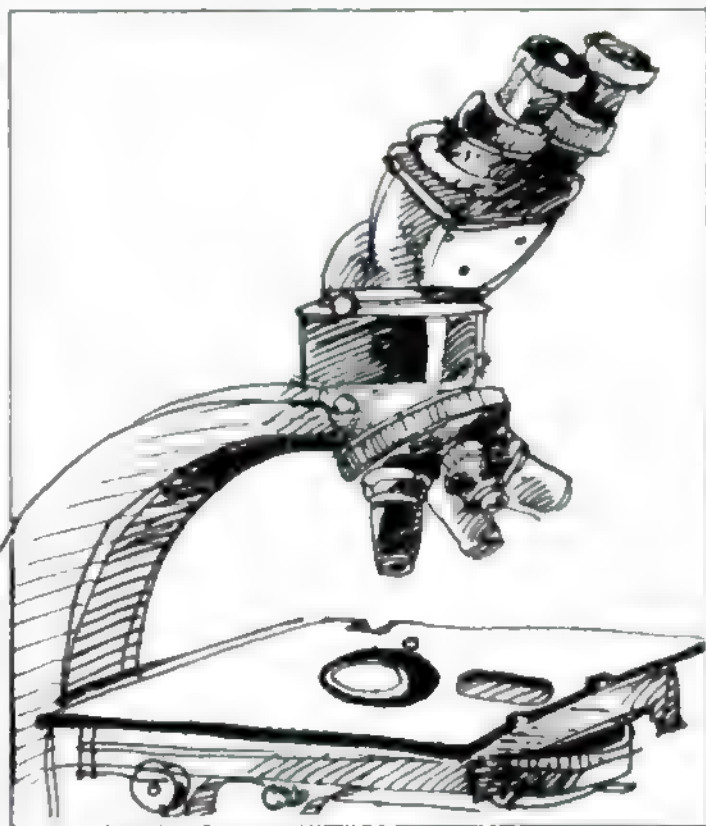
PC Clinical Testing

CRS lets you systematically analyze information from patient profiles. If you want to study the incidence of runner's knee among women who chalk up 60 miles a week, CRS can help.

Clinical Research System (CRS) is an integrated package with a difference. It was created to meet the specialized needs of medical researchers who monitor and analyze data from multicenter clinical trials.

CRS combines database management with statistical analysis and graphics functions. Although the package does not include word processing or spreadsheet features, you can use them by transferring the data files to other software if you reformat into data interchange format (DIF) files.

The team of programmers and pharmacologists at the International Medical Products Corporation (IMPC) who designed CRS tailored it so it could easily be used, after a brief introduction, by individuals with no computer expertise. As



such, the program is largely menu-driven and most menu selections are straightforward. Because the program is written in assembly, C, and compiled BASIC, the menu transitions are fast. In addition, the 160-page documentation is complete, clearly written, and easy to follow, with several useful flow diagrams.

CRS handles data in stages. To begin, you define the study design and variables. You then may enter data along with the time of data collection. Version 2.0 allows entry of 17 variables (one variable group) at a time. But a future version will include routines that allow you to link multiple variables in entry sequences.

CRS lets you display and print data in several ways, including bar graphs, scattergrams, and line graphs.

In a multi-user system, you can protect your data by requiring a password that you define—unique to each study—for accessing the data. A future update will improve data security measures.

Patient Profiles

Using logical criteria, the query function will retrieve patient data defined by the appropriate criteria. You can, for example, call up the study data concerning patients with specific profiles, such as all diabetics over 65 years old having systolic blood pressure above 160 and receiving a particular medicine.

After the data has been summarized, you can transform it by creating a new variable consisting of a mathematical function operating on one or more existing variables. Weight in pounds, for example, can be used to generate weight in kilograms.

The main feature that distinguishes CRS from other integrated products is its statistical analysis function. This function lets you analyze summarized data in most of the ways commonly used on medical data. Because the system operates as if you understand the selection and use of statistics, the reference guide explains only how to conduct the tests

Clinical Research System

International Medical Products Corp.
4503 Moorland Ave.

Minneapolis, MN 55424

(612) 835-4018

List Price: CRS I, \$900; CRSII \$1,800; CRSIII, \$3,000.

Requires: 128K RAM, two disk drives, color/graphics adapter card, color graphic or monochrome graphic monitor.

CIRCLE 697 ON READER SERVICE CARD

MEDICINE

but doesn't discuss their applications.

Brief reminders about the appropriate applications of each analysis would be helpful for those who deal with statistical

analysis infrequently.

Descriptive statistics available in *CRS* include the mean, standard deviation, standard error, and range. Frequency

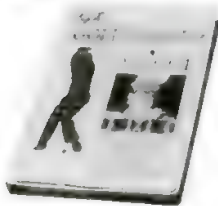
distributions can be calculated and plotted for one variable at a time. You can superimpose a normal distribution curve if you want to know whether the data is distributed normally.

By performing a one- or two-tailed student t-test, you can analyze the differences between two populations for any interval-level variable. Any of three null hypotheses can be specified. With this feature you can, for instance, analyze the difference between the mean blood cholesterol levels of patients taking drug A versus that of patients using drug B.

The linear regression analysis does a least-squares calculation and plots the interrelationship for two variables. It yields the standard linear regression statistics and is the most straightforward way of looking at how closely associated two variables are that you think either share a common causality or have a cause-and-effect relationship. For example, it would compare the systolic blood pressures of a person lying down and one standing or of a person with an elevated blood cholesterol level and one having a heart attack.

The Mann-Whitney U-test, a powerful rank test, is the only analysis that *CRS* now performs on nonparametric data (that distributed in a nonnormal pattern). This test, which analyzes the difference between the distributions of ranked variables paired in two study samples, is useful for checking the significant differences in, for example, the responses of two patient groups to a questionnaire about a new approach to health care.

Two very useful analyses, which were left out of Version 2.0, are included in Version 2.1. The manufacturer has said the new version will allow you to cross-tabulate when analyzing the distribution of two or more categorized (nominal, ordinal, or interval) variables in a study population. This feature could allow you to tabulate the incidence of impotence in two groups of patients, one of which took an investigational drug and one of which did not. A chi-square test would



Are You Ready For the Challenge?

GOLF'S BEST

Use your mental golf strategies and our realistic golf simulation software, GOLF's BEST to win.

The World famous Pinehurst No. 2 course is the setting for our first tournament.

PINEHURST
WORLD'S PREMIER GOLF RESORT

First Prize

- \$1,000 cash plus an all expense paid trip for 4 to Pinehurst.
- Special prizes for 2nd thru 10th places, too! Over \$6,000 in total prizes.

The purchase of GOLF's BEST will give you one entry in our tournament. Practice as many times as you want then mail us your best score by May 31st, 1985 to be eligible!

Now available at your nearby COMPUTERLAND stores, IBM Product Centers and other recognized dealers. only

\$49.95

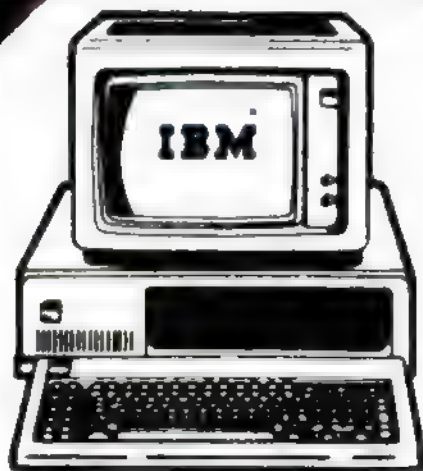
For the IBM PC, PC-XT, PC Jr, PC-AT and PC Portable.

1STEP, Charlotte Plaza, Suite 1300
Charlotte, NC 28244 704-554-7255



CIRCLE 171 ON READER SERVICE CARD

SAVE



- Low Low Prices
- Service
- Support

1-800-237-4048

(ORDERS ONLY)

SAVE

COMPUTERS		DISPLAY CARDS		PRINTERS	
IBM		HERCULES		OKIDATA	
PC, 2 DSDD DRIVES, 256K1966		COLOR CARD/PRINTER PORT160		82A292	
XT, 1 DSDD/10MB, 256K3823		MONOCHROME GRAPHICS329		83A, WIDE CARRIAGE556	
AT, 1 QD/20MB, 512K5395		MULTI-FUNCTION CARDS		84P, WIDE CARRIAGE666	
PORTABLE, 2 DSDD, 256K2214				92P378	
COLUMBIA		AST		93P, WIDE CARRIAGE591	
PC, 2 DSDD, 128K1890		SIX PACK PLUS, 64K, CSP275		2350P1790	
XT, 1 DSDD/10MB, 128K3164		MEGAPLUS, 64K TO 512K280		2410P1790	
PORTABLE, 2 DSDD, 128K2030		COMBOPLUS, 64K, CSP280		TRACTOR FOR 82/9245	
MP-2, 64K TO 384K, CLOCK247		ADVANTAGE, TO 3MB FOR ATCALL		EPSON	
TELEVIDEO		QUADRAM		RX-80235	
PC, 2 DSDD, 256K1960		QUADBOARD, OK, CSPG235		RX-80, WITH TRACTOR300	
PC, 2 DSDD, 256K, COLOR2263		MODEMS		RX-100 WIDE CARRIAGE405	
XT, 1 DSDD/10MB, 256K3472		HAYES		FX-80, WITH TRACTOR421	
XT, 1 DSDD/10MB, 256K, COLOR3623		300 BAUD204		FX-100, WIDE CARRIAGE638	
PORTABLE, 2 DSDD, 256K1706		300/1200 BAUD486		LQ-15001096	
1200B, INTERNAL383		MISCELLANEOUS		NEC	
MONITORS		MEMORY, 64K34		2050697	
AMDEK		KEYTRONICS 5151 KEYBOARD199		35501399	
300, GREEN120		PRINTER STANDS FROM15		85501811	
300, AMBER131		FLIP-N-FILE15		BI-DIRECTIONAL TRACTOR154	
310A, AMBER147		THE SOURCE SUBSCRIPTION33		CUT SHEET GUIDE64	
600, RGB COLOR413		PRINTER CABLE24		JUKI	
710, SUPER HI RES COLOR546		MODEM CABLE13		6100383	
PRINCETON		VERBATIM DISKS, DSDD23		6300747	
MAX-12, AMBER169		BASF DISKS, DSQD FOR AT65		BI-DIRECTIONAL TRACTOR122	
HX-12, RGB COLOR470		MICROFAZER BUFFER, 8K129		SINGLE SHEET FEEDER200	
SR-12, SUPER HI RES/DOUBLER874		MICROFAZER BUFFER, 64K213		MPI	
QUADRAM				SPRINTER463	
AMBERCHROME, MONO167				SPRINTER X540	
QUADCHROME 2, RGB COLOR430				TRAVEL LID38	



COMPUTER MART
1901 S. TAMiami TRAIL
VENICE, FL 33595

IBM is a Registered Trademark of International Business Machines
Prices subject to change We accept MasterCard VISA, Money
Orders, certified and personal checks and COD shipments

IN FLORIDA CALL 813-493-2736



MEDICINE

then determine whether the patients receiving the new drug became impotent more often than the patients taking a placebo.

Current and Future Versions

The developers of CRS performed diversified beta testing with their customers, private physicians, and government

tal agencies. The result is a flexible product well suited to a broad range of uses. As more versions are released, IMPC will have a family of editions specific to many different needs.

CRS is not copy protected. The user's manual gives clear directions for using it with a hard disk. The price includes free enhancements and modifications for up to a year after purchase.

The basic, single-user version is called *CRS I*. Two additional versions, *CRS II* (an enhanced version of *CRS I*) and *CRS III* (a multilocation version) sell for \$1,800 and \$3,000, respectively.

Sample Users

CRS can help you regulate your patients' hypertension. You can analyze the treatment on graphs and in tables and use them to help you decide which medicine gives the best results with the fewest adverse side effects. Patients also can look over the results, which makes CRS a valuable patient education tool as well.

CRS can be used to monitor and improve patient follow-up for many purposes, including immunizations and care for chronic illnesses such as diabetes. You can send reminders to patients about such varied treatments as scheduling routine PAP smears and following up on abnormal PAP smears, breast exams, mammography, proctosigmoidoscopy, or blood cholesterol checks.

CRS is also useful for special situations such as periodic recertification by a national specialty board. CRS can identify appropriate patients and summarize their records, which can then be forwarded to the certifying board for auditing.

The high quality of CRS makes it worthwhile to medical researchers and to physicians who want to use the microcomputer for improving the quality and efficiency of their patient care. ■

Michael Crouch is an academic family physician who teaches residents and medical students, sees patients, and does clinical research in Shreveport, Louisiana.

Disks out of control? Tame that data.

With the disk management
tools of

The Norton Utilities.™ Featuring the Hard Disk Helpers.

If you've got a fixed hard disk or stacks of diskettes you know how tough it can be to keep track of it all. Enter *The Norton Utilities, Version 3*. Practical disk management tools. They find those files. They show those directories. They search for data. They put your directories in order. They're the hard disk helpers (for diskettes, too).

Lost your data?

Bring 'em back alive.

Through the magic of file recovery with

The Norton Utilities

Featuring the legendary *UnErase*™

Life insurance for Your Data

If you've ever lost vital data, you know what it's like. If you haven't, consider yourself lucky. Enter *The Norton Utilities, Version 3*. Honest to gosh file recovery. Featuring the legendary *UnErase*. If it can be done, we'll bring 'em back alive. Can you afford to be without it? It's life insurance for your data.

Twice voted "World Class" best utilities - PC World Winner of Softalk popularity poll! Softsel best-seller. The N.Y. Times says, "don't compute without them." Users groups "They set a standard for the industry."

Data recovery
Disk management

Norton Utilities and more!

The Norton Utilities, Version 3.
Featuring the legendary *UnErase*.
Everybody says they're terrific.
We say they're \$99.95.

Got an old version? Upgrade for \$25.
Just send a check and your old disk.

New Version 3!
More features!
Complete disk support!
Works with nearly any disk
and nearly any DOS computer



Nobody does it like Norton

The Norton Utilities

available at Computerland, other
dealers or order direct for \$99.95:
Peter Norton
2210 Wilshire Blvd.
Santa Monica, CA 90403
Phone orders (213) 399-3948
Visa and Mastercard welcome

CIRCLE 346 ON READER SERVICE CARD

—ORDER DESK ONLY—
(800) 292-3360
TOLL FREE IN CALIFORNIA

Specializing in
Corporate Accounts

MC-P

APPLICATIONS, INC.

The Best Computer Solution

The Best Prices - Best Service - Best Technical Support

—ORDER DESK ONLY—
(800) 292-3360
TOLL FREE OUTSIDE CALIF.

SOFTWARE

SPREAD SHEETS

Lotus 1-2-3	\$299
Symphony	425
Framework	372
Multiplan	135
Open Access	369
TK Solver	265
Supercalc III	275
Visicalc IV	157
Design Manager	475

DATA BASE

dBase II	279
dBase III	372
R:Base 4000	289
KnowledgeMan w/K paint & K graph	295
Powerbase	275
Friday	195
DB Plus	95
Quick Code & DUtil Pak	185

UTILITY

Peter Norton Utility	55
Prokey	87
Sideways	45

COMMUNICATION

Microstuf Crosstalk	115
Smartcom II	109
Transporter	205

PROFESSIONAL

Desk Organizer	195
Harvard Project Manager	275
Compusoft Legal/Software— Call for info.	
Real Estate Analyser II	175
Visi Schedule	125

COMPILERS

Cobol Compiler	485
Fortran Compiler	245
Lattice 'C' Compiler	325
Microsoft 'C' Compiler	325
Microsoft Pascal Compiler ..	215
Macro Assembler	65
Digital C Basic Compiler	375
Pascal MT and CPM186	255

FINANCIAL

Home Accountant-Apple	49
Personal Investor	135
Accounting Plus GL, AP, AR, PR, INV Each	399
State of the Art GL, AP, AR, PR, INV Each	485
Peachtree GL, AR, AP Each	475
Think Tank	125
Data Cell II (Tax Preparer) ..	1125

WORD PROCESSING

Bank Street Writer IBM	55
Edix/Wordix Each	129
Peach Text 5000	245
Pfs: File	84
Pfs: Report	79
Multimate	275
Volkswriter Deluxe	162
Word Perfect	275
Wordstar Pro w/Correctstar	299

NATIONAL SALES

MC-P

APPLICATIONS INC.

1630 Oakland Road,
Suite A114

San Jose, CA 95131

U.S.A.

Telephone: (408) 293-3360

Telex: 821 396 MCPA UD

RETAIL OUTLETS

Pick 'N Pay Software

San Jose, CA

Telephone (408) 293-3360

Pick 'N Pay Software

Phoenix, AZ

Telephone (602) 285-1700

MC-P International Sales Offices

AUSTRALIA	(02-929-8468)
NEW ZEALAND	09-34545
SAUDI ARABIA	02-660 9684
HOLLAND	020-268829

ORDER STATUS AND TECH. SUPPORT — CALL

(408) 293-3360

PLEASE CALL FOR
HARDWARE & SOFTWARE

NOT LISTED THIS AD

INTERNATIONAL DEALER
INQUIRIES WELCOMED

TERMS: All prices subject to change without notice. Payment by cashier's check/MO/bank transfer. Please allow approximately one week shipping delay for clearance of personal or company checks. California residents add sales tax. For non cash sales please add 3% handling charge
SHIPPING: Add \$4 per item for UPS Surface, \$8 for UPS Blue Label. For Monitors add \$20 and Printers \$25 for shipment within continental U.S.A.

HARDWARE

COMPUTERS

IBM PC 64K/1DD/Ctrl Cd	\$1545
IBM PC/XT 128K	3495
IBM Portable	2195
Apple IIc	1145
Apple IIe 80 col & Mon.	1295
Macintosh w/Imagewriter Printer	2595

DISK DRIVES

Teac Half Height	165
Tandon 100-2	195

HARD DISKS

Tall Grass 12 Mgb	2245
Pegasus 10 Mgb (Internal) ..	1095
Iomega 10 Mgb	call
Everex/Cogito 10 Mgb	995

PRINTERS

Epson FX100	695
IBM Parellel Printer Cable	29
LQ 1500	1145
NEC 3550	1675
Okidata 92P	409
Qume 1140 plus	1435

MONITORS

Amdek 12" 310A	169
Amdek Color II RGB Hi-Res	399
Princeton RGB Hi-Res	485
IBM Monochrome	235
IBM color	565

MODEMS

Smart Mod. 300 w/Smartcom	245
Smart Mod. 1200	495
Smart Mod. 1200B	429
J-Cat	99
Smart Cat 103	169
Smart Cat 103/212	425

HARDWARE & PERIPHERALS

Megaplug 64K	265
Six Pac Plus 64K	265
Quadboard II	285
Orchid Blossom	255
64K Ram Chips	45
Techmar Graphics	525
Hercules Graphics	335
Plantronics	395
STB	335
Intel 80/87 Chip	175
Orange	94
Peach	64
Irma Board	895
Compuguard	call
Kraft Joysticks	35
TG Joysticks	35
Hayes Mach III Joysticks	39
PC Mouse w/Software	165

NETWORK

Orchid PC Net	345
PC Net w/Blossom	525

COMMUNICATIONS

AST 3780	635
AST 5251	545

CIRCLE 290 ON READER SERVICE CARD

DISCOUNT PRICES PLUS FREE SHIPPING



IBM PC²

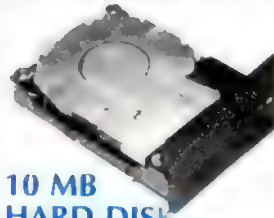
PC-2 w/64k ram
and keyboard
(drives & controller extra)

\$1195



**AST
SIX PAK PLUS**
w/64K
\$259

**64K
MEMORY CHIPS**
Set of nine
\$29



**10 MB
HARD DISK**

• Low Power Miniscribe
Hard Disk • Western
Digital Controller
1yr. warranty
\$675



**COMPAQ
PORTABLE**

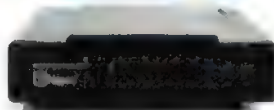
• 256K RAM
• Two disk drives
• Parallel Port
• DOS

Call

SOFTWARE

dBase III \$399
Framework \$389
Volkswriter deluxe \$159
Turbo-Pascal \$45
Wordstar (ProPak) \$259
Norton Utilities \$ 59
Crosstalk XVI \$129
Hayes Smartcom II \$110
Koala Pad w/software \$ 99
Set-FX+ \$ 49

MODEMS



HAYES

Hayes 300 Baud \$209
Hayes 1200 Baud \$475
Hayes 1200 B (internal) \$419

MONITORS

PRINCETON MONITORS

HX 12 RGB (690 x 240) \$475
MAX 12 Amber
Monochrome \$175

AMDEK

310 A \$175
300 A \$159
300 G \$149

MISCELLANEOUS

Keytronics
KB 5151 Deluxe Keyboard **\$199**

8087 Math Coprocessor
Chip \$145

BOARDS

AST

AST Monograph Plus Lotus 123
graphics on monochrome card,
parallel port, clock/calendar
(optional serial port) \$349

AST I/O Plus Serial port, clock
calendar (optional 2nd serial
port or parallel port) \$129
optional serial or
parallel port \$35

AST Memory expansion board
w/64k, upgradable to 384k,
clock/calendar, includes
Superspooler and Super
drive \$239

HERCULES

Monochrome/Graphics Card
w/parallel port \$325
Color/Graphics Card w/parallel
port \$165

PARADISE SYSTEMS

Multi-display board (both
monochrome & RGB) \$329

PERSYST

Monochrome Adapter Card
w/parallel port \$199

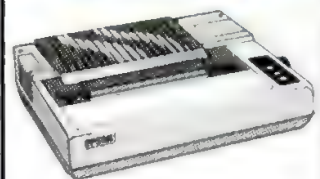
QUADRAM

Multifunction Board—new
expanded Quad Board w/64k
(upgradable to 384k), clock
calendar, parallel & serial ports,
game port, I/O bracket and
Quadmaster software \$259

Quad Color I color/graphics
card \$190

Quad Color II (Add-on) \$229

PRINTERS



EPSON

Call for current low prices.

TEXAS INSTRUMENTS

TI855 w/Tractor Feed \$729

JUKI

6100 (18 CPS, Par-13") \$429

OKIDATA

ML 92 (160 CPS, Par 10") \$429

ML 93 (160 CPS, Par-15") \$659

ML84P (200CPS, Par-15") \$759

SMITH-CORONA

D-200 (120CPS, fric/trac NLQ
mode) \$439

D-300 (140CPS, fric/trac NLQ
mode) \$599

HEWLETT-PACKARD

HP 7470A Plotter
(2 pen, serial interface) \$879

HP 7475 Plotter
(6 pen, serial interface) ... \$1499

TEAC 55B

½ Height, 5¼" Double Sided
40 TRK, 48 TPI \$135

CDC 9409

5¼" Double Sided
40 TRK, 48 TPI \$159

Tandon TM100-2

5¼" Double Sided
40 TRK, 48 TPI \$159

OUR POLICY We accept Mastercard, Visa, Money Orders, Certified Checks, Personal Checks (allow 10 days for processing), COD, Company/Institutional P.O.'s and Wire Transfers. No credit card surcharge. We do not charge your card until we ship (usually within 24 hours). We pay shipping (UPS ground, fully insured) on orders delivered in continental U.S.A.

Add sales tax if Texas resident. Prices are subject to change. All equipment carries a new factory warranty. Any return item must be accompanied by a return authorization number. For product information, price quotes, technical support and orders call:

Within Texas (512) 250-1489 Outside Texas **CALL TOLL FREE (800) 531-5475.**

CompuAdd

"Computer Add-On Products"

CIRCLE 226 ON READER SERVICE CARD

RETAIL OUTLET
5720 Bandera Rd. #14
San Antonio, Texas 78238
512-684-8010

RETAIL OUTLET
2894 Bee Cave Rd.
Austin, Texas 78746
512-327-4825

RETAIL OUTLET
12034 Research Blvd., #1
Austin, Texas 78759
512-250-8594

RETAIL OUTLET
204 E. 6th Street
Austin, Texas 78701

MAIL ORDER:
12103 Technology Blvd.
Austin, Texas 78727
512-250-1489

Modeling with 1-2-3: The RAND Command

The RAND random number generator in 1-2-3 can help you turn your spreadsheet into a realistic financial modeling tool—or it can help you play blackjack against the computer.

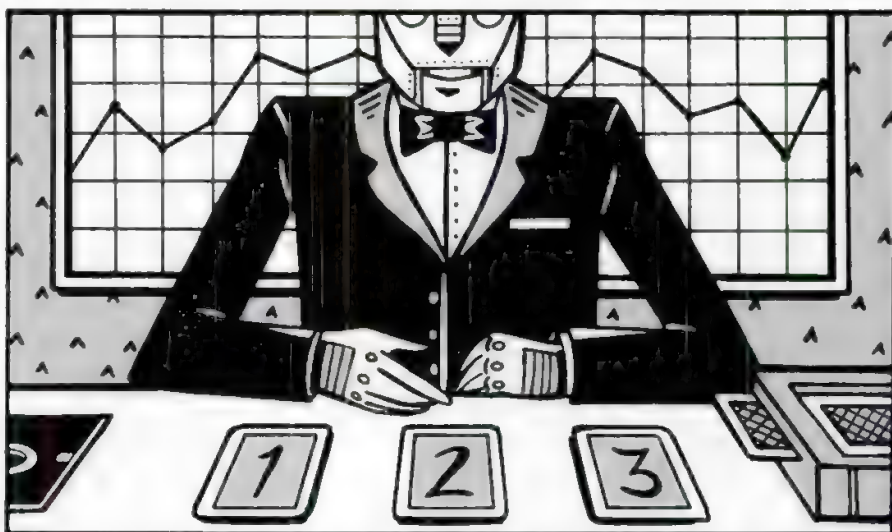
The power of 1-2-3 is great, but it is surprising how few people have mastered its more subtle capabilities. If you learn to use some of 1-2-3's more esoteric functions, you can change a simple spreadsheet into a sophisticated model worthy of an experienced programmer—or even into a game of blackjack.

One such 1-2-3 function, RAND, can be manipulated to improve your financial analyses and decision making. To explore the use of the RAND function, at the end of this article I have included a model that simulates a blackjack game. It illustrates ways of improving your financial analysis.

Many elements of financial analyses lend themselves to the use of random number generation, including Monte Carlo simulation. For example, assume you are working on a project for which you need to predict the annual inflation and interest rates for the next 10 years. The typical way to account for these variables is to make a basic assumption that you apply throughout the cash flow analysis, such as that inflation equals 4 percent.

Variability

In most financial models, the timing of variable factors affects the outcome. For example, assume you predict 4 percent inflation for the next 10 years. You could



apply annual inflation factors in a number of ways, each averaging 4 percent over 10 years. In most cases, each scenario would result in a different answer when applied to other worksheet factors. Which is the best answer for your 4 percent assumption?

Let's Be Realistic

Assuming an average 4 percent inflation rate over the next 10 years and applying it in each year of the analysis results in a one-point per year estimate. The world and economy are hardly going to sit back and maintain this constant relationship for the next 10 years.

Instead, why not take the analysis one

step further and randomly generate inflation rates that average out to near the assumed 4 percent inflation rate over the next 10 years. By running several quick calculations, you can derive a set of outcomes from which you can determine a broader range of estimates and plot a frequency distribution. This technique may not be a perfect solution, but it does offer you more information on which to base decisions. If nothing else, you should be able to gain a better understanding of how variable your outcome is likely to be and the possible high and low values you might get while maintaining nearly the same basic assumption.

(continued)

IF YOU SUBSCRIBE TO



PLEASE READ THIS

... Take a moment now and remove your mailing label and save it with this message. Your label is very important and helps us to help you quickly!

• When moving, send us your label with your new address 8 weeks before you move to PC MAGAZINE, P.O. Box 2445, Boulder, Colorado 80322.

• If you have a question about your subscription, simply send us a note with your label, or a note with your name, address and Personal Identification Number to P.O. Box 2445, Boulder, Colorado 80322.

Your Expiration Date

OCT 83

Affix label here

Your P.I.N.

802222

City State Zip

Your Name

Your Company

Address

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

If you have just subscribed, you'll receive your first issue in 30 to 60 days.

FINANCE

Randomizing

With the RAND function, you can quickly generate several scenarios, each closely averaging 4 percent. By setting up random inflation factors (see listing at right), you can generate rates between 0 and 8 percent. Use 1-2-3's /RFP command and two decimal places. Each time you run a new calculation using the random table, new rates are generated and your outcome changes. By recording the results of a series of these outcomes, you gain an appreciation of a broader range of possible results.

1985	RAND*.08
1986	RAND*.08
1987	RAND*.08
1988	RAND*.08
1989	RAND*.08
1990	RAND*.08
1991	RAND*.08
1992	RAND*.08
1993	RAND*.08
1994	RAND*.08

It is important to understand certain standard statistical relationships when you are generating random numbers. For

@RAND FORMULA	LOW	HIGH	AVERAGE
@RAND*.08	.00	.08	.04
@RAND*.10-.01	-.01	.09	.04
@RAND*.12-.02	-.02	.10	.04
@RAND*.10	.00	.10	.05

Figure 1: These RAND statements produce different high-low values.

```

A1: @ROUND(@RAND*13+.5,0)
C12: (GOTO)D1~/RED1.F6~
C13: /C(ESC)(HOME)~(EDIT)(CALC)~
C14: (RIGHT)(RIGHT)/C(ESC)(HOME)~(EDIT)(CALC)~
C15: (DOWN)(LEFT)(LEFT)/C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)
C16: (GOTO)L1~(GOTO)O5~
C18: (GOTO)F2~
C19: /C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)/XIP10>16~/XG\O~
C20: /C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)/XIP10>16~/XG\O~
C21: /C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)/XIP10>16~/XG\O~
C22: /C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)/XIP10>16~/XG\O~
C23: /C(ESC)(HOME)~(EDIT)(CALC)~(CALC)(DOWN)/XIP10>16~/XG\O~
C25: /WGPE(GOTO)L1~
C27: (GOTO)D1~(END)(DOWN)(DOWN)~/C(ESC)(HOME)~(EDIT)(CALC)~
C28: (CALC)(DOWN)(GOTO)L1~
O1: "ME
O2: "----
O3: @IF(D1>10,10,D1)
O4: @IF(D2>10,10,D2)
O5: @IF(D3>10,10,D3)
O6: @IF(D4>10,10,D4)
O7: @IF(D5>10,10,D5)
O8: @IF(D6>10,10,D6)
O10: @SUM(O3.O8)
P1: "DEALER
P2: "-----
P3: @IF(F1>10,10,F1)
P4: @IF(F2>10,10,F2)
P5: @IF(F3>10,10,F3)
P6: @IF(F4>10,10,F4)
P7: @IF(F5>10,10,F5)
P8: @IF(F6>10,10,F6)
P10: @SUM(P3.P8)
N14: [ALT] S TO START NEW HAND
N16: [ALT] C TO DRAW ANOTHER CARD
N18: [ALT] D TO FINISH OUT DEALER'S HAND
    
```

Figure 2: A spreadsheet model simulating the game of blackjack.

FINANCE

example, it is unlikely that the average inflation rate for any one calculation in the chart is exactly 4 percent. In effect, you are only telling the program to generate inflation rates between 0 and 8 percent; you aren't saying that the average inflation rate is 4 percent. If you use more random numbers to come up with a desired average, you can reduce the variability of the distribution around that average.

By adjusting the RAND formula, you can control the range and high-low values of the random numbers while trying to obtain a desired average for your outcome. Figure 1 shows a few examples of how you can control the RAND function.

Blackjack

Just as with many other features of 1-2-3, the RAND function can be used in several different ways, for business and for pleasure. The model in Figure 2 simulates the game of blackjack. It may be less practical than financial Monte Carlo, but it's at least as much fun.

In this model, the RAND function generates numbers between 1 and 13. All random numbers between 11 and 13 (assumed to be equivalent to jacks, queens, and kings) are converted to 10. My random formula is a single line of code:

```
UND(RAND*13+.5,0)
```

Enter the contents of Figure 2 into your worksheet. Use the /WGPE command to protect the whole worksheet. Then remove the protection from cell A1 and range D1.F6. Use /RNC (Range, Name, Create) to indentify the following macros:

Range Name	Range
\S	C12..C16
\D	C18..C23
\O	C25..
\C	C27..C28

Save your worksheet and then retrieve it. Play a few hands, and, with experience,

you will gain a better respect for the RAND function.

Good luck, but my bets are on the dealer. ■

James Boswell is a financial and systems analyst for C.A.C.I., Incorporated, a consulting firm located in Arlington, Virginia.

"Volkswriter® Deluxe..." the critics' choice!



“Thirty word processing programs were reviewed ... no other program received a higher overall evaluation than Volkswriter Deluxe.”

Software Digest Ratings Newsletter, January 1984

“If WordStar™ set a standard ...

Volkswriter Deluxe sets a new standard

for transparency, simplicity, and speed. You can learn Volkswriter in under an hour ... because it does so many things exactly the way you think they should be done.”

“VOLKSWRITER DELUXE is the best buy in the IBM-PC™ writing tool arena.”

Charles Spezzano, Whole Earth Software Review, January 15, 1984

“Volkswriter Deluxe ... a simple way to word processing power ... for writers who like to think.”

Washington DC Capital PC User's Group Vol. 3, #4

“Lifetree ... provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent.”

“In sum, this is a unique word-processing program.”

John Lombardi, Reviewer, InfoWorld, April 16, 1984

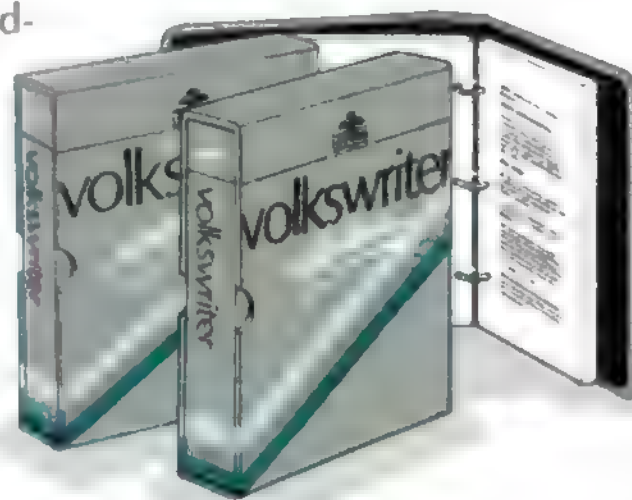
**We couldn't
have said it
better ourselves!**

Suggested Retail Price: Volkswriter Deluxe \$295 for the IBM-PC, PC compatibles, TI Professional™ and TRS-80 Model 2000™

“simply, amazing”

IBM PC is a trademark of International Business Machines. TI Professional Computer is a trademark of Texas Instruments. TRS-80 Model 2000 is a trademark of Tandy Corp. WordStar is a trademark of MicroPro

© 1984 Lifetree Software, Inc.



411 Pacific Street
Monterey, California 93940
(408) 373-4718 / TWX 176786

CIRCLE 385 ON READER SERVICE CARD

TECH/ADVICE (818) 344-6063 SALES (800) 528-9537

IBM	
PC2 256K 2 disk	\$1795
PC2 256K 2 disk-high TEC disk	\$1825
PORTABLE2 256K 2 disk	\$2395
XT1 256K 10MB	\$3335
AT1 BASE CONFIGURATION (see 2596)	\$3385
AT1 w/256K for 5270	\$4495
AT1 w/10MB	\$4595

LEADING EDGE PC AND FPD

Both by Microchannel

Compatibility Service Policy

If you buy a LE computer from Epson and you find any software is incompatible that doesn't operate the same as it would on an IBM PC or XT, Epson will loan you a go-between to get the software or hardware modified to operate as advertised.

The exception is software distributed by IBM.

• **Best speed CPU - Pentium, serial, clock - 7 mhz disk -**

MS-DOS 2.11, IBM-Style

Once your warranty, nationwide service.

MONO PC-256 2 Disk, 256K RAM, Mono w/Screen... \$1330

AMBER2 Swap meter CRT for Green... \$ 10

COLOR PC-256 2 Disk, 256K RAM, Color with 17" RGB... \$1895

FPD models include a 10MB/150 hard disk, and one 256K floppy...

disk. The savings is easily more than a \$1000 vs. IBM XT with similar features.

MONO FPD-256 256K RAM, Mono/Screen... \$2225

AMBER2 Swap meter CRT for Green... \$ 10

COLOR FPD-256 256K RAM, Color/Screen... \$2570

Recommended Options:

LE Word Processing Software... \$ 75

RAM Set (304K installed)... \$ 295

RAM Disk and Port Spooler software... \$ 25

Micro-Graphic Video Line Hercules, includes...

132MHz swap... \$295

SANVO

Among the mini-computers, SANVO is still a best buy largely due to the Microbus no-charge bundle.

MICRO-2 1 disk, double sided... \$ 730

MICRO-2B2 Enhanced with 2 disk (20K each) disk... \$ 880

MICRO-2 2 disk, double sided... \$1090

RAM's Additional 128K... \$ 74

SANVO SERIAL PORT... \$ 70

SANVO #415 RGB video... \$ 395

TEAC 558 drive substitution... \$ 137

CAD/C Drafting software... \$ 95

COPYLINK Modem software... \$ 75

COMULATORS dual floppy format CHM... \$ 85

BARTOSAN Auto BASIC conversion... \$ 99

SERIAL Transfer values... \$ 25

GRAPHICS Graphics to printer... \$ 45

Complete list of Sanvo software - hard-copy, self-addressed envelope.

COMPAQ

PORTABLE 256K 2 disk... \$2240

PORTABLE PLUS 256K 10MB... \$2880

DISKPRO... \$2 - \$285 \$3 - \$395 \$4 - \$575

Compaq prices include green CRT.

NEC APC-III

Storix II with a computer's value must depend on its speed of operation. By this measure, the APC-III is 4 times more computer than an IBM PC. This results from an 8086 CPU at 8 MHz vs. IBM PC at 4.7 MHz. Standard package includes MS-DOS, GW-BASIC, one parallel, one serial and 10MB RAM.

#H102M 2-disk, mono... \$1695

#H102C 2-disk, color... \$1925

#H111M 1-MB mono... \$2595

#H111C 1-MB color... \$2785

#H107 256K RAM, 256K main... \$ 275

#H108 256K RAM, 256K main... \$ 145

#H110 256K RAM, 256K main... \$ 175

UNIX-MONO System hard disk 256K RAM, UNIX... \$3450

UNIX-COLOR System 400K RAM, UNIX... \$3650

GENERAL PERIPHERALS

Anchor Automation Mark XII modem... \$ 245

Backup Power 200W PT... \$ 275

300W... \$ 375

CA #P2 6-Plug Monitor Base... \$ 99

C-10H F-10-40 daisy-wheel... \$ 945

F-10-55 55cps/day... \$ 245

Coroq Laser Printer 18 sheets/min... \$3250

Datapoints Prism 132C, 1200cps, color dual model... \$1325

8070/1400cps, 120 model... \$1895

Epson FX-80... \$ 395

FX-100 wide... \$ 615

QJ1500 wide... \$1275

Hayes 1200 Smartmodem... \$ 485

H-P Laserjet Printer... \$2895

H-P Thinjet Printer... \$ 445

Mazell 25 Disk-Hammer write... \$ 19

NEC PC8027 (PC8021 w/handler) printer... \$ 365

P2 Printer write... \$ 675

P31 write (wide)... \$ 875

Quidata 92P 1... \$ 425

93P... \$ 625

Plotters/Digitizers Houston Instrument... \$1595

Printonix P-300 w/Cen... \$1100

P-600 w/Cen... \$1700

Prometheus Promodem 1200... \$ 355

Options Processor... \$ 75

O-4 "A" 8" w/width Serial... \$ 65

"A" 8" w/width Parallel... \$ 85

Star Micronics printers...

Gemini 10-X matrix... \$ 275

Gemini 15-X wide... \$ 385

PowerType daisy, writer and par... \$ 355

Tractor... \$ 55

TAXAN #305 TV TUNER... \$ 95

#500 PRINTER BUFFER 164K exp to 756K... \$ 215

Reviewer's Favorites: All listed products have been

screened for marketability and general usefulness. How-

ever, a few products are marked for exceptional interest

or value with a bullet.

PC PERIPHERALS

Amdek 310A amber CRT... \$ 149

710 RGB color... \$ 940

AST PC-Net II Starter Kit... \$ 275

AST Super+, 64K... \$ 285

Co-Processor 8087 Std... \$ 145

DFC 5150B hard disk controller... \$ 320

Everex Graphics Edge... \$ 395

10MB Internal Hard Disk System... \$ 845

FT 15+5 External... \$2790

FT 33+5 External... \$2475

RAM Cartridge... \$ 95

Genie S+5... \$2680

Genie 11+11... \$3085

11MB Cartridge... \$ 145

Hayes 1200B w/Smartmodem... \$ 435

Hercules Graphics Card... \$ 335

I-2 10MB tape... \$ 835

Tapes... \$ 49

IBM Keyboard... \$ 95

ICOMega PC-20 dual removable... \$2875

10 MB cartridge... \$ 88

IRMA... \$ 895

Keytronic K85151... \$ 195

Shannon w/Pop-up and Paint... \$ 145

Orchid PC Barbe-Que... \$ 970

Blossom 64 w/PCNet... \$ 575

Paradise Modular Graphics Bd... \$ 275

"A" Module (15" x 10)... \$ 10

"B" Module (256K RAM) (256K w/Pop-up)... \$ 235

PC Replacement 100W Power... \$ 125

Paradyt 800 w/Scan #440... \$ 975

PCIS H8-12... \$ 465

SH-12 w/Scan Doubler... \$ 765

MAX-12 amber... \$ 180

Phone Activated Power Module... \$ 175

Prometheus Promodem 1200B w/soft... \$ 285

RAM 64K (9 chips)... \$ 41

RAM 256K (9 chips)... \$ 325

Sakata 13" RGB w/Quick Anti-Glare... \$ 485

Shipping Case... \$ 350

STB Graphics Plus II... \$ 385

Tandon 100-2 dtd... \$ 175

TEAC 558 drive w/interfacer... \$ 137

Technar Graphics Master... \$ 475

5 MB Removable Disk... \$1475

3COM Etherlink... \$ 285

Vertex Apple Transfer... \$ 280

VoiceMail Dialing... \$ 445

EPSON FX-80 GENERAL

This is an extraordinary value in an 80-column "big"

computer. Includes Wordstar spreadsheet, 8 line display,

and cassette drive.

\$795

PC SOFTWARE

Crestlink XVI... \$135

Remoto... \$125

STransporter... \$195

edbase II... \$425

edbase II - III kit... \$145

edbase II - III kit... \$ 49

Fancy Font... \$155

Fonttrix... \$110

Framework... \$425

Framework Programmers' Reference... \$ 23

Harvard Project Manager... \$285

Kernington Business Control... \$155

Knowledgeman... \$355

Lotus 1-2-3... \$310

Lotus Symphony... \$455

Lotus 1-2-3 to Symphony... \$155

Microsoft Fortran... \$245

Microsoft Multiplan... \$145

Microsoft WORD w/Windows... \$275

Morgan Trace-86... \$ 97

Morton Utilities 2.01... \$ 59

Prokey 3.0... \$ 95

Quaid Copy Write... \$ 50

Quaid Disk Explorer... \$ 75

Quaid Zero Disk... \$ 75

Release 4000... \$295

Clout... \$145

TKI Solver... \$285

Water Disk (DOS)... \$ 25

Vertex XeroxCopy Plus 2.0... \$135

XeroxDisk... \$365

480Mega (2 80 emulators)... \$135

Warner Desk Organizer... \$195

WordStar Pro (newest)... \$345

Xyindex Std (1980 documents)... \$125



EXPERT COMPUTERS

TECH (818) 344-6063

SALES (800) 528-9537

EASYLINK 888647 IBM-USA

17314 CRENSHAW BLVD.
TORRANCE, CA 90504

Prices may change - confirm by phone 7% fee for VISA, MasterCard
4% fee for American Express. 20% non-refundable deposit required on
CDD orders. California residents add sales tax. 15 DAY WARRANTY. Call
TECH/SERVICE to obtain return authorization - we will repair or replace
at our option. This warranty is in addition to manufacturer's warranty.

Can your editor work with 16,000,000 bytes of memory? SPF/PC™ 1.8 from CTC can!

The best full screen editor for the IBM PC is now even better than ever.
It looks and works like IBM's large system SPF editor, but SPF/PC
executes faster and handles larger files than its mainframe cousin.

AT EXTENDED MEMORY

SPF/PC can use up to 15,850 KB of memory.

TOP VIEW COMPATIBLE

SPF/PC supports windowing and
background execution.

COMMUNICATIONS FEATURE

Easy to use communications software.

\$195

UPGRADES only \$50
(\$10 if communications upgrade)

Add \$5 for shipping
Canada \$10 Foreign \$15



Check or purchase order
accepted.

FAMILY TIES

- SPF/PC is used by IBM to demonstrate the IBM 3270/PC to its corporate clients
- SPF/PC provides the same outstanding performance on any PC, from JR to AT
- SPF/PC works with DOS 1.00-3.00 and any IBM PC or true compatible with 192K

IBM is a registered trademark of International Business Machines, Inc. SPF/PC is a registered trademark of Command Technology Corporation.

TO ORDER
SPF/PC...

Contact: Command Technology Corporation
1900 Mountain Boulevard
Oakland, CA 94611.

(415) 339-3530
Telex: 509330

CIRCLE 182 ON READER SERVICE CARD

Legal Connections

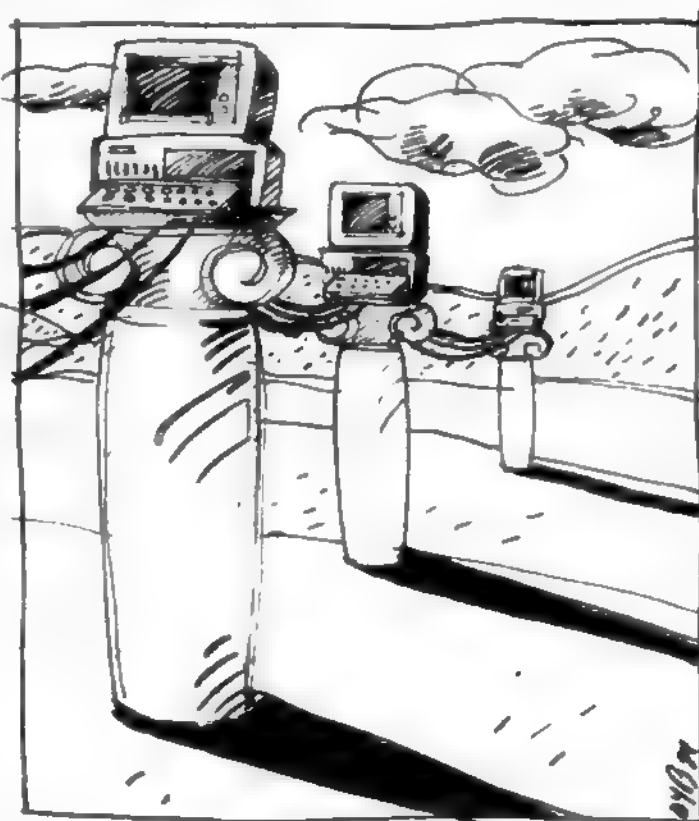
Law firms can substitute modems for the local area networks of the future. They help attorneys and staff share information and services, saving money, time, and effort.

In the ideal law office of the future, large computers, micros, word processors, telephones, printers, disk drives, mass storage files, and all other digital devices will be interconnected in one integrated network, allowing attorneys and support staff to share services and information. IBM recently announced several network technologies (local area networks or LANs), but these large-scale systems are still 2 or 3 years away. Even then they may not support non-IBM equipment. And they will surely be expensive.

An Alternative to LANs

In the meantime, modems offer a low-cost, efficient solution. Attorneys and support staff equipped with PCs, modems, and communications software can function as an efficient team, sending documents back and forth and sharing useful peripheral devices otherwise not worth the cost. Using proven, available technology, modems even facilitate some communication functions not performed by networks, notably in-house communications and access to external computers, including databases (see "On-Line Libraries," *PC*, Volume 3 Number 11).

Often different members of a firm draft various sections of documents. Securities registration statements, for ex-



ample, are often broken into parts and divided among a team to register them quickly. They can be expedited if lawyers can refer to their colleagues' drafts while writing their own sections. Other long, specialized documents can also be prepared more quickly if attorneys exchange preliminary drafts. And team drafting helps during litigation, allowing lawyers, under tight deadlines, to file briefs citing new precedents and recently discovered facts.

Lawyers often must quickly execute documents that involve other outside parties—contracts negotiated in corporate departments, for instance. Drafts can be sent between the parties' lawyers

via modems, allowing both sides to make the necessary changes and agree quickly on a final draft. When modem-equipped paralegals also share files with attorneys, delegating support work and collaborating on projects become much easier.

For example, a paralegal might set up and enter certain antitrust data, which an attorney could then selectively access through an integrated spreadsheet/graphics package to create graphs for a presentation to his or her client.

The Word of the Law

Many courts require legal petitions from law firms to be typeset. Before firms could afford laser printers, they were obliged to pay legal print shops to typeset all their petitions. However, now that laser printers are in the \$3,500 price range, even medium-size law firms can afford them. Attorneys can now cut down their turnaround time to meet late deadlines on rush documents.

Other input and output devices that a firm probably would not purchase for every attorney can be economically shared via modems—letter quality printers, tape drives, digital cameras, and digital plotters. Plotters, for example, are not often found around law firms. But with integrated spreadsheet/graphics packages, lawyers can use them to produce multi-colored graphs and color transparencies

(for overhead projectors) to enhance presentations.

Plotters are particularly useful in merger cases and tax work. Antitrust specialists use graphs to interpret economic data in merger cases to analyze market concentration for corporations, among other factors. Tax specialists can demonstrate the effects of alternative tax strategies for clients. For example, they can analyze alternative investments using stacked bar graphs to ascertain their effect on the minimum income tax or capital gains tax. They can also graph the tax effects of various depreciation and royalty depletion strategies.

The law office of the future will probably include a digital camera or document reader that can photograph any document or graphic display a lawyer is researching. With appropriate commands, this

The law office of the future will probably include a digital camera or document reader.

picture can be placed into the memory of the computer, stored on disks, and reproduced at any future time. The camera adds efficiency because it enables the computer to access large numbers of documents easily and accurately.

Although a few law firms own large minicomputers to handle vast amounts of information, smaller firms can also deal with great volumes of data by adding a tape drive to their PCs that can process

the same tapes used on mainframe computers. These drives, designed to be run with micros, are useful for storing lengthy depositions. They can also access data from the Census Bureau and other sources, formerly available solely via mainframe.

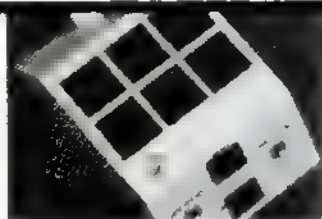
With shared peripheral devices, attorneys can compose letters and send them to a central PC for editing, filing, indexing, and letter quality printing. In this manner, the professional staff saves considerable time because the support staff does the actual processing and filing.

Computers linked by modems can also be used to send electronic messages between offices. Unlike phone calls, these messages do not interrupt lawyer-client consultations or disturb concentration. Lawyers can even confer confidentially via their PCs with colleagues in other of-



IBM PERSONAL COMPUTERS AND ACCESSORIES

PART NO.	PCjr. & Accessories	PRICE
IBM PCjr	Enhanced Model complete with 128K, 360K drive and 2 cartridge slots.	\$949.95
IBMDOS2.1	Disk Operating System Software.	\$ 59.95
IBM-JCM	PCjr. Color Monitor.	\$399.95
IBM-JAC	PCjr. Adapter Cable-RGB Color. (Needed for Color Monitor operation)	\$ 19.95
IBM-TVC	PCjr. Connector for TV.	\$ 29.95
IBM-CPR	PCjr. Compact Printer.	\$169.95
IBM-CPC	Compact Printer Adapter Cable. (Needed for Printer operation)	\$ 39.95
IBM-SAC	PCjr. Serial Adapter Cable.	\$ 39.95



PROTECT YOURSELF... DATASHIELD® Surge Protector

Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. 6-mo. warranty. Power dissipation (100 microseconds): 2,000,000 watts

PART NO.	DESCRIPTION	PRICE
MODEL 75	4 Sockets, On/Off Switch.	\$49.95
MODEL 85	6 Sockets, Super Filters, On/Off Switch.	\$59.95
MODEL 100	6 Sockets, Super Filters, Low Voltage Alarm.	\$69.95
MODEL 110AMS	6 Sockets, Super Filters, Auto. Master Switch.	\$99.95

DATA SHIELD® BACK-UP POWER SOURCE also available. Protect your PC, XT or AT computer from black-outs, brown-outs, power surges and line noise.

PC200	(200 Watt Rating).	\$299.95
XT300	(300 Watt Rating).	\$399.95
AT800	(800 Watt Rating).	\$799.95

PART NO.	IBM PC's	PRICE
IBM64K0	System Unit w/64K-No Drives.	\$1195.00
IBM256K2	System Unit w/256K-2 (360K) Drives.	\$2149.95
IBMPC-XT	PCXT System 256K with 8 Slots & Async Card.	\$3799.95
IBMDOS2.1	Disk Operating System Software.	\$ 59.95

PART NO.	Monitors	PRICE
IBM-MGM	IBM Monochrome-Green-Monitor.	\$259.95
IBM-RGB	IBM Full Color RGB Monitor.	\$599.95

PART NO.	Cards	PRICE
IBM-MC	IBM Monochrome Card (Plus Printer Port).	\$224.95
IBM-CC	IBM Color Card.	\$229.95

PART NO.	Expansion Boards & Memory	PRICE
AST64K	Six Pak Plus 64K upgradeable to 384K, with Clock Calendar, Serial & Parallel Ports.	\$309.95
IBM64K	The IBM64K Kit will increase memory in 64K byte increments. 9-200ns 64K RAMs.	\$ 43.95
IBM128K	The IBM128K Kit will increase memory of the IBM PC AT in 128K byte increments. 9-250ns 128K RAMs.	\$199.95

PART NO.	Modems	PRICE
PM1200	Prometheus RS-232 Stand Alone 1200B Unit.	\$349.95
PM1200B	Prometheus 1200B Internal Unit.	\$269.95
PM1200BS	Prometheus 1200B Int. Unit w/ProCom Software.	\$319.95

PART NO.	Disk Drives & Hardware	PRICE
FD55B	Teac 5 1/4" Double-Sided, Half Height.	\$149.95
TM100-2	Tandon 5 1/4" Double-Sided, Full Height.	\$159.95
FHD-10	Franklin 10MB Hard Disk.	\$949.95
IBM-TMH	Teac Mounting Hardware.	\$ 4.95

PART NO.	Cables	PRICE
IBM-8PC	8' IBM Parallel Printer Cable.	\$24.95

We also specialize in integrated circuits, custom cables, power supplies and much, much more!
Call or write for our NEW 1985 Catalog today!

\$10.00 Minimum Order - U.S. Funds Only
California Residents Add 6 1/2% Sales Tax
Shipping - Add 5% plus \$1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets - 30¢ each
Send \$1.00 Postage for your
FREE 1985 JAMECO CATALOG
Prices Subject to Change



1355 SHOREWAY ROAD, BELMONT, CA 94002
2/85 Phone Orders Welcome (415) 592-8097 Telex: 176043

fices on matters pertaining to clients who are with them at the time.

Of course, electronic messages can be sent most efficiently if office computers are hooked to separate interoffice telephone lines. Since most law firms own their own intercom lines, additional telephone costs for separate computer connections would be modest.

To send electronic messages, the attorney calls up a communications program and initiates auto-dial and auto-answer by typing the appropriate dial code. The receiving computer automatically displays the message if the communication program is running and the modem has been given the appropriate command to auto-answer the telephone.

During trials, lawyers can send queries from distant courthouses with briefcase-size portable computers. Of course,

the portable computer must have either a built-in modem, as the latest models do, or a serial interface into which the modem can be plugged. A central PC can be dedicated to be in answer mode at all times. Messages can then be directed to the central machine with less effort than to the peripheral computers, which might be in use.

Selection and Installation

Auto-dial, auto-answer modems work best in a law office environment. They include a processor that executes a series of commands you program from the computer keyboard. Internal or external modems are equally acceptable, as are 300- or 1200-baud models.

A communications program should serve your needs. It must support auto-answer and auto-dial features. It should

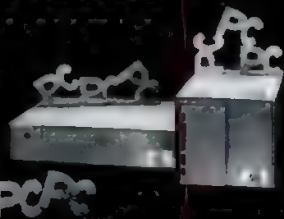
also have a dialing directory that permits disk storage of telephone numbers and the communication parameters required for each listing. In addition, the program should be able to store passwords for on-line databases, such as Lexis and Westlaw.

Although large law firms with more shared devices and more computers may derive greater cost savings by installing additional modems, smaller firms can also benefit. Such tasks as research contract negotiation are enhanced by automation in any size law firm. ■

Werner Grunbaum has taught at the University of Missouri-St. Louis since 1967. His areas of interest include graphics, environmental law, tax planning, trust management, and simulation of judicial decision-making.

Memo to IBM users

SUBJECT:
Put 8 IBM's
on the CUBE and
take 42 big
(mega) bytes



METHOD:
Using the SCS MULTIPLEXER illustrated.

RELEVANT DATA:

- SCS MicroCube Winchester Mass Storage System for IBM PC's and XT's holds 8, 10, 21, and 42 MB. Uses RODIME 8 1/4" Winchester Hard Disc Drives.
- SCS Micro-Multiplexer for IBM PC's and XT's Supports 8 IBM's — 16 with extender.
- SCS TS-60 High Speed Tape Streamer Backup stores 42 MB on tape in 9 minutes.

CONCLUSION:

Order through IBM dealer or get more information by enclosing business card with this memo and send to:

Space Coast Systems, Inc.

301 S. Washington Ave., Dept. C • Titusville, FL 32796
305-269-0872 • Telex 701506

FREE CATALOG

**YOUR 80-PAGE GUIDE TO COMPUTER
SUPPLIES AND ACCESSORIES — INCLUDING
COMPLETE NEW PRODUCT DESCRIPTIONS.**

- Packed with over 1600 products for microcomputers, minicomputers, and word processors — many available nowhere else
- Comprehensive product descriptions — including more than 475 full-color photos — clearly explain features and benefits
- Big special section devoted to new supplies and accessories
- Easy-to-use cross reference guides to magnetic media, ribbons, and more — along with the industry's most complete cable guide

- Helpful suggestions and tips, ranging from flexible disk care to proper ribbon selection to useful application ideas.

**PHONE 1-800-547-5444*
TOLL-FREE OR
SEND COUPON TODAY.**

inmac

Inmac Catalog Dept. 2465 Augustine Dr.
Santa Clara, CA 95054

Please rush my free copy of the Inmac Catalog

NAME _____
COMPANY _____ PHONE _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

*In California, call
1-800-547-5447



434114

CIRCLE 373 ON READER SERVICE CARD

CIRCLE 225 ON READER SERVICE CARD

100% IBM*

System No. 1

IBM 256K
2 IBM Disk Drive
IBM Mono Board
IBM Mono Display
2.1 DOS
\$2377.00

System No. 2

IBM XT 256K
IBM Mono Board
IBM Mono Display
2.1 DOS
\$3901.00

System No. 3

IBM—AT
Entry + Enhanced
IN STOCK
\$CALL

*IBM IS A REGISTERED TRADEMARK OF THE INTERNATIONAL BUSINESS MACHINE CORP.

•COMPUTERS•

IBM 256K-2 Drives . . . 1936.00
IBM 256K-XT 3516.00
IBM 64K-2 Drives . . . 1596.00
IBM 64K-1 Drive . . . 1452.00
IBM AT Entry CALL
IBM AT Enhanced CALL
Compaq 256K Dual Drive
 2150.00
Compaq 10 Meg Plus . . 3500.00
AT&T 6300 2425.00
AT&T 6300 w/10 MEG 4150.00

•DRIVES•

Tandon 100-2 159.00
Teac ½ Height CALL
Tallgrass 12MB/20MB . . CALL
TG 3020 2775.00
Davong 10, 20, 32 MB . . CALL
Micro Science 10MB . . 725.00
CDC 179.00
CMI-For AT-20MB . . . 895.00
CMI-For AT-40MB . . . 1095.00

•MODEMS•

Hayes 300 199.00
Hayes 1200B 409.00
Hayes 1200 475.00
Smartcom II 70.00

•MONITORS•

Amdek 300A 152.00
Amdek 300G 135.00
Amdek 310A 165.00
Amdek Newest Models . . CALL
Princeton HX-12 467.00
Princeton MAX-12 . . . 178.00
IBM Color 560.00

•PRINTERS•

Epson FX-100 600.00
Epson RX-80 254.00
Epson FX-80 379.00
Toshiba 1351 1309.00
Toshiba 1340 775.00
NEC 3550 1395.00
Juki 6100 CALL
Okidata 92, 93 CALL

•BOARDS•

IBM Color Graphics . . 195.00
Persyst Mono/Parallel . 234.00

•HOURS•

Monday-Thursday 10-8 PM EST
Friday-Sunday 10-4 PM EST



(212)

420-8363

**QUADRUN 384K
QUADBOARD**

w/64K
RAM **\$249**

**AST \$229
SIX PACK PLUS**

w/64K
RAM **\$249**

**FRAMEWORK
ASHTON-TATE**

It's
HERE! **\$399**

**LOTUS 1,2,3
\$305.00
SYMPHONY**

\$425

**IBM
MULTIMATE**

\$265

★ ★ ★ ★ ★ ★ ★ ★	MONTHLY	SPECIAL	★ ★ ★ ★ ★ ★ ★ ★
COMPAQ 256K DUAL DRIVE \$2150.00	NEC 3550 LETTER QUALITY \$1395.00	EPSON LQ-1500 \$1099.00	EPSON FX-100 \$600.00

Expert Consultation

Years of experience have assured our customers of the most cost effective systems for their personal application requirements. You can be sure that the products we supply you with will solve your computer needs and at a price you can live with, so you'll want us again and again.

Assembly & Testing

Before delivery, all parts of your system are tested and assembled, separately and as a whole, to make sure each is working to the fullest potential!

Professional Service

There's service, and then there's I.B.M. service. Our staff is professional and experienced to provide you with the answers and solutions to all your questions. Anything you buy from us is backed by us!

Warranty

All Computer systems are backed with manufacturers warranty. Extended warranty is available through **XEROX AMERICARE** Program (call for details).

Shipping

Prices do not reflect shipping charges. All products are shipped and handled on a C.O.D. basis. You should allow up to 2 weeks for delivery.

MASTER CARD AND VISA ACCEPTED

Hyped-Up Authoring

Although it's likely that authoring systems will continue to be only marginally popular, HyperGraphics, a capable product useful for more than multiple-choice quizzes, may buck the trend.

Authoring systems for microcomputers never have been particularly big sellers. They are widely perceived as useful chiefly to secondary school teachers for a fairly limited group of applications—creating multiple-choice quizzes and drill-and-practice sessions.

HyperGraphics is an authoring system with potential well beyond multiple-choice quizzes. You can, for instance, use it to design attractive user interfaces for other software or, to a limited extent, to create on-line tutorials that simulate the operation of other programs.

Simplicity of use is one of the great virtues of *HyperGraphics*. Although it isn't menu driven, the program requires that you learn only a few simple commands. The accompanying documentation serves well as a quick reference.

The first step in creating a courseware



module is to format the file you will use to store screens and branching logic. The 300K file of the authoring system will supply between 200 and 500 independent screens. The number of screens available will depend on the type and amount of information on each. Since a screen with graphics will take up more memory than one with text, the more graphics used, the fewer independent screens available.

Two distinct editors—one for text mode and one for both graphics and text—are available. For screens that contain any pictorial content, you must use the graphics editor.

The drawing functions in *HyperGraphics* include line, rectangle, circle,

free-form, and color-fill—the basic elements needed to produce just about any kind of picture. Deletion of individual components within a drawing is a tedious process; the drawing must be recreated from scratch each time you delete an element. In some situations you can speed up this process by using a special key sequence that lets you delete all the material that was put into a drawing between a given point in the drawing sequence and the end.

Color Dress Up

The program's excellent drawing and painting capabilities allow you to spruce up your presentation with color visuals,



HyperGraphics

HyperGraphics Corporation
100 North Central Expwy., # 1208
Richardson, TX 75080
(214) 783-9900

List Price: \$395

Requires: 128K RAM, color graphics board and monitor.

CIRCLE 698 ON READER SERVICE CARD

VICTORY CAN BE YOURS ON THE ELECTRONIC BATTLEFIELD WITH SORCERERS & SOLDIERS



Conquest and glory are within reach when you learn the concepts, rules and winning strategies behind computer adventure games with *Sorcerers & Soldiers*.

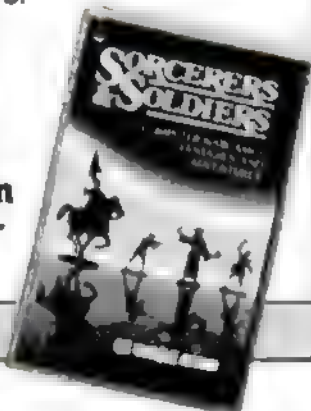
Daring and game-winning moves will be your trademark as you learn to think as deviously as the people who write these fantasy, war and role-playing computer games.

Sorcerers & Soldiers provides descriptions, tactics and even hardware requirements for popular games plus an extensive glossary of adventure terminology.

Order your copy today.

Also available at your local bookstore and computer store.

For faster service call toll free 9 am-5 pm E.S.T. 1-800-631-8112. (In NJ only 201-540-0445).



Creative Computing Press

Dept. FD8C, 39 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ copies of *Sorcerers & Soldiers* at \$9.95 plus \$2.00 postage and handling (\$5.00 outside USA) each. #79-8

☐ Payment enclosed \$_____
*Residents of CA, NJ and NY State add applicable sales tax.

Charge my:

☐ American Express ☐ Visa ☐ MC

Card No. _____

Exp. Date _____

Mr./Mrs./Ms. _____

please print full name

Address _____

City _____

State/Zip _____

☐ Please send free catalog.

EDUCATION

and primitive animation is possible.

You are not limited to presenting entire screens all at once: the program allows you to specify points in the display of text and graphics where the user would have to press a key to bring up the next bit of information. You can also set things up to appear on-screen after a 3-second delay with no user intervention.

You can direct *HyperGraphics* to branch to an external executable module, which can be an .EXE file created by a compiler for any language you choose. Whenever you desire a series of events outside the capabilities of the authoring system, you can specify a call to the external program. When that program ends, execution reverts automatically to *HyperGraphics*, thereby returning users to the point at which they exited.

Some Bugs

I found some odd quirks in *HyperGraphics*. At times, I lost my work by hitting the wrong keys. This happened more than once while editing a drawing—an operation requiring shifting in and out of the Insert mode. I rebooted accidentally by hitting keys near the Ins key and the numeric keypad, not by striking the standard Ctrl-Alt-Del combination.

In one case, I stored such an accidental key sequence with a screen. What happened was that every time the program branched to that screen, the system would reboot. I had no opportunity to erase and recreate the offending screen, so eventually I simply entered instructions to branch around it.

I noticed another minor annoyance when using the color-fill function for situations in which several line-drawn figures overlapped. Depending on where you place the cursor inside the empty figure, *HyperGraphics* may not follow instructions and may not find any boundaries, except the screen's borders.

Room for Improvement

Although *HyperGraphics* measures up, a few easy-to-implement enhance-

ments could improve it considerably. A command for duplicating an area that's already been drawn would save users valuable time and could be combined with animation.

Another useful enhancement would be greater control over automatic object materialization. As things now stand, mate-

The program allows you to spruce up your presentation with color visuals.

rialization occurs automatically after 3 seconds. Because most users will hit a key to bring on the next event before 3 seconds have elapsed, successive keystrokes are stored in a buffer and retrieved by *HyperGraphics* in rapid-fire order. Ideally, users could vary the materialization rate or control the rate at which characters are released from the buffer. A related feature would prevent the buildup of keystrokes in the buffer by refusing to accept a user prompt for anything other than the very next event.

In addition, *HyperGraphics* could have more flexibility if it had a facility to branch to an author-specified screen based on a string match. This would be especially helpful for simulating software that requires the user to enter a certain command before performing an action. For example, if a user typed LIST, the software would branch to a screen representing a file listing.

The excellent graphics facilities of *HyperGraphics* distinguish it among authoring systems. In the hands of someone with moderate or better artistic skills, it can produce courseware that is much more engaging than the traditional products of authoring systems. ■

Gregory Dunn is a programmer and technical consultant who lives in Austin, Texas.

NOW AVAILABLE THE MANUAL:

THE MANUAL:

LOTUS 1-2-3

FOR ALL OF YOU WHO WANT
A 2ND MANUAL FOR YOUR
BACK UP PROGRAMS.

CHEAPER THAN MAKING
PHOTO COPIES OF YOUR
ORIGINAL MANUAL.

NOW EVERYONE IN YOUR
FIRM CAN HAVE A COPY OF
THE MANUAL:

USE THE MANUAL:
AS A BACK UP COPY.

FOR ALL
THE POPULAR
PROGRAMS.

LOTUS 1-2-3 • SYMPHONY
FRAME WORK • dBASE II
MULTIPLAN • WORDSTAR
APPLE WORKS

Only **\$14⁹⁵**. EACH

Lotus 1-2-3 is a trademark of Lotus Development Corporation
Symphony is a trademark of Ashton Tate.
Frame Work is a trademark of Ashton Tate
dBase II is a trademark of Microsoft Corporation
Wordstar is a trademark of Micropro International
AppleWorks is a trademark of Apple Computer Corporation.
Multiplan is a trademark of Microsoft Corporation.
THE MANUAL is a trademark of Management Information Source, Inc.

PLEASE SEND ME THE FOLLOWING BOOKS:

- | | |
|--|---------|
| <input type="checkbox"/> Lotus 1-2-3 | \$14.95 |
| <input type="checkbox"/> Symphony | \$14.95 |
| <input type="checkbox"/> Frame Work | \$14.95 |
| <input type="checkbox"/> dBase II | \$14.95 |
| <input type="checkbox"/> Multiplan | \$14.95 |
| <input type="checkbox"/> Wordstar | \$14.95 |
| <input type="checkbox"/> Appleworks | \$14.95 |

(Corporate discounts available.)

CIRCLE 349 ON READER SERVICE CARD

CARD No. _____ Exp. Date _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TOTAL ENCLOSED \$ _____ ☐ VISA ☐ MasterCharge

SIGNATURE _____ ☐ AMEX ☐ CHECK

MANAGEMENT INFORMATION SOURCE, INC.

3543 N.E. Broadway, Portland, Oregon 97232

Contact us for other low prices on hardware and software.

Next Day Air Extra

ALL PRICES INCLUDE FREE SHIPPING IN USA.

These prices current as of December 21, 1984. Call for latest prices.

TEAC
55-B, Half Height, DS/DD
\$129

PANASONIC
JA5512 Half Height DS/DD
\$109

Same as Shugart SA-455

IRWIN
MAGNETICS

TAPE BACKUP SYSTEM

- Half Height
- Low Power
- Uses Floppy Controller Card
- 10 55 Meg Formatted Capacity
- Used in Compaq Desktops

\$595

Another PC's Limited Exclusive! FREE UP AN EXTRA SLOT!

Our specially-designed combined Floppy/Hard Disk Controller gives you 4 system expansion slots open for additional boards!



\$2195

IBM PC™
256K
1/360K
Floppy Drive
10 MEG Internal

64K RAM
Set of 9 chips, 200 or 150 Nanoseconds
Quantities of 50 or more
\$25 \$19
per set

IBM PC™ **\$1595**
256K, 1 DS/DD Drive IBM is a trademark of IBM Corp.
Also available: 810
10, 20, 33, and 42 Megabyte Internal Hard Disk.
See below for details.

with Hard Disk by
Microscience International Corporation



Same hard drive as used by
Quibe and Kamenman Labs

One year warranty.

10 MEG INTERNAL HARD DISK SYSTEM

Our 10 megabyte Hard Disk System uses a state-of-the-art Half Height Low Power Hard Disk, thereby eliminating overheating problems typically associated with Hard Drives. The system uses DOS 2.1 or 3.0 without any modifications, is Plug Compatible with the IBM XT, and gives you the ability to boot directly from the hard disk. The system comes complete and ready to install with the low power Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware.

\$629

One year warranty.

with Hard Disk by
Shugart



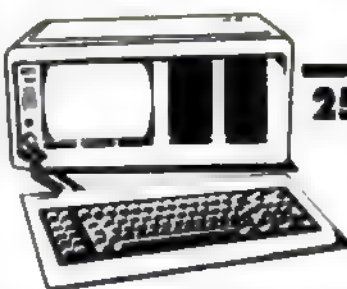
Same hard drive as used by
Maynard Electronics

10, 20, 33, and 42 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

Externally mounted with independent power supply and fan
Fully DOS 2.1 or 3.0 compatible. Boots from Hard Disk
* 20, 33 and 42 Meg internal disks include
extender power supply

One year warranty

	10 MEG	20 MEG	33 MEG	42 MEG
Internal	\$629	\$995	\$1395	\$1595
External	\$829	\$1095	\$1495	\$1695



COMPAQ

Functional equivalent
to a Compaq Plus.

**256K, 1/360K drive,
10 Meg Internal**

\$2995

Now using 3 1/2" shock-mounted Winchester drives.
The same as used in the Compaq Plus.
Also available with 2 half-height drives—\$3195.

CDC 9409—\$159

HARDWARE

**Persyst Time Spectrum
w/OK—\$189**

AST SixPak Plus w/540K	\$184	Persyst Monochrome Card w/Parallel	\$175
AST SixPak Plus w/64K	\$259	PGS HX-12	\$179
PC Set Blossom w/64K	\$239	PGS MAX-12	\$179
Hercules Color Card	\$175	Epson	CALL
AST Monograph Plus Parallel/Clock	\$169	Juki 6200	\$429
Hercules Graphics Card w/Parallel	\$169	Okidata 92193/84	\$399/\$639/\$719
Paradise Modular Graphics Card	\$295	TI 855	\$729
Paradise Module A Parallel Port	\$169	Hayes Smartmodem 1200	\$489
Paradise Module B64 256K/Clock	\$209	Hayes Smartmodem 1200B	\$399

Sidekick — \$35

Non-Copy Protected Sidekick — \$59

Copy II PC	\$24
Copywrite	CALL
Disk Explorer	CALL
Zero Disk	CALL
Prokey 3.0	\$89
Sideways	\$39
Thinktank	\$119

SOFTWARE

Norton Utilities— Version 3.0, Dec. '84 Release **—\$59**

Borland Gift Pack—\$69

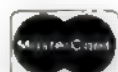
Harvard Project Manager	\$259
Multimate	\$269
Wordstar 2000	\$299
Wordstar 2000 +	\$359

Turbo Pascal — \$35

Turbo Toolbox — \$35

PFS/Graph	\$89
PFS/Plan	\$89
PFS/Proof	\$69
PFS/Write	\$89
PFS/Access	\$63
PFS/File	\$89
PFS/Report	\$79

PC'S LIMITED



Microscience International Corporation, Irwin
Magnetics, TEAC, Panasonic, Shugart, Quibe,
IBM, Kamenman Labs, and Maynard Electronics
are trademarks of their respective companies.

ORDERS ONLY, CALL 1-800-IBM-5150
7801 N. Lamar, #E-200, Austin, Texas 78752
All other inquiries, call (512) 452-0323

No surcharge on VISA or MasterCard
4% surcharge on American Express

PC User Groups

This list is a partial directory of PC user group names and addresses. Use this listing to locate other PC aficionados who congregate in your area or around the world.

NORTH DAKOTA

Fargo IBM Personal Computer Users Group

c/o Loren D. Jones
1339 Seventh Ave. S.
Fargo, ND 58103
(701) 280-2608

Grand Forks IBM Personal Computer Users Group

c/o John D. Hilley
717 Ives St.
Buxton, ND 58218
(701) 847-2935

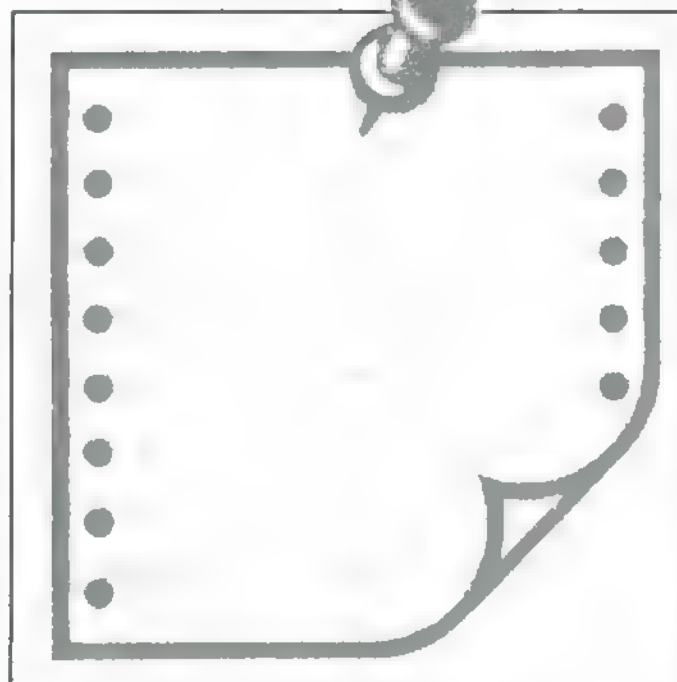
OHIO

ACORN: Greater Cincinnati IBM PC User's Group

c/o Harvey Eastman
P.O. Box 3097
Cincinnati, OH 45201

Western Reserve IBM PC Association

c/o Larry Gavin
ComputerLand
2000 North Road SE
Warren, OH 44484



Lake-Ashtabula IBM Personal Computer Users Group

P.O. Box 175
Madison, OH 44057

IBM-PC Users Club

c/o Chuck Harrington
315 Cutler Hall
Ohio University
Athens, OH 45701
(614) 594-6125

Northeast Ohio PC Club

c/o Kelvin Gerhart
P.O. Box 662
North Olmsted, OH 44070

Greater Cleveland PC Users Group

c/o Roy McCartney
30704 Royalview Dr.
Willowick, OH 44094
(216) 944-5173

Miami University IBM-PC Users Group

c/o Debra Allison
The Computing Center
Miami University
Oxford, OH 45056

Mansfield Area IBM PC Users Group

c/o Gary Stiffler
1145 Conwell Ave.
Willard, OH 44890

Akron/Canton PC Users Group

c/o James C. Finucane
10690 Clapsaddle Ave.
Alliance, OH 44601
(216) 935-0252

Columbus IBM-PC SIG

c/o Frank R. Neal
1358 Byron Ave.
Columbus, OH 43227
(613) 239-9300

PC will publish a periodic listing of PC user groups. Send new addresses or address changes to "Club News," PC, One Park Ave., New York, NY 10016. New groups and address changes are shown entirely in **boldface**.

KEDIT

Mainframe Editing Power (and more!) **\$125**

Announcing **KEDIT**, the most powerful full-screen text editor yet for the IBM PC. It provides facilities normally found only on mainframe computers and extends these facilities to take full advantage of the PC's keyboard, display, and dedicated processing power. Your PC will finally be equipped to handle even the most advanced editing applications.

- DOS 2 path and subdirectory support
- edit up to 15 files at once
- multiple display windows show you up to 8 files at once
- block move and copy, even between files
- sophisticated string search and change
- wordwrap, paragraph reformatting and justification
- all keys programmable with any combination of over 100 special functions
- DOS directory display

XEDIT Compatibility

XEDIT is IBM's text editor for the CMS operating system. **KEDIT** is compatible with most XEDIT capabilities, including

- | | | | |
|-------------------|-----------|-----------|---------------|
| ■ targets | ■ ARBCHAR | ■ RECOVER | ■ SCHARGE |
| ■ prefix commands | ■ GETFILE | ■ SORT | ■ named lines |

KEDIT requires:

IBM PC, XT, or AT / DOS 2.0 or later / 80 column display / 192K

For immediate shipment of **KEDIT** send check or money-order for \$125 plus \$3 shipping. CT residents add 7½% sales tax. For more information call **203/429-8402**.

Demonstration disk available for \$10.

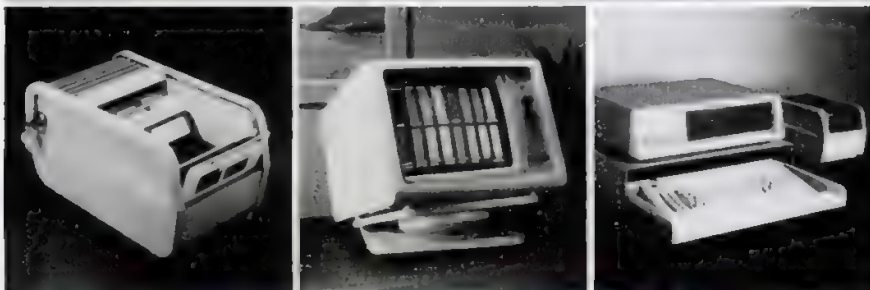


Mansfield Software Group, Box 532 / Storrs, CT 06268

CIRCLE 378 ON READER SERVICE CARD

YOUR SINGLE SOURCE.

MicroComputer Accessories Inc. is the innovator in unique, useful and ergonomic accessories for the personal computer user. Just three of our growing line of products, from left: the **Rolltop 100® Disk File**—stores 120 5¼" microdiskettes in ten color coded sections; the **Tilt 'n Turn®**—supports large CRT's with stable 25° tilt and 360° turn; the **Keyboard Storage Drawer**—cantilevers keyboards over narrow credenzas or typewriter returns, locks in position. At fine computer/software retailers.



MicroComputer Accessories, Inc.

5721 Buckingham Pkwy. / P.O. Box 3725 / Culver City, CA 90231 Telephone 213/641-1800

NV MicroComputer Accessories Europe SA / Rue de Florence 37, 1050 Bruxelles, Belgique / Telephone 02/538.61.73

CIRCLE 148 ON READER SERVICE CARD

CLUB NEWS

The Ohio State University IBM PC-Users' Group

c/o Art Krumsee
Office of Continuing Education
210 Sullivant Hall
1813 North High St.
Columbus, OH 43212

IPCO, Inc.

International PC Owners, Inc.
P.O. Box 5100
Poland, OH 44514-0100

OKLAHOMA

IBM PC Users Group

c/o Roger Baresel
Deloitte Haskins & Sells
700 Fidelity Plaza
Oklahoma City, OK 73102
(405) 232-6191

IBM Personal Computer Users Group (PCBUG)

c/o Lynn Long
P.O. Box 471114
Tulsa, OK 74147-1114
(918) 749-6396
(918) 628-1400

OREGON

PC Users Group

c/o Greg Estes
P.O. Box 5070
Eugene, OR 97405

Portland PC Users Club

P.O. Box 2068
Beaverton, OR 97075

Corvallis PC Computer Club

c/o Bob Collins
P.O. Box 1977
Corvallis, OR 97339

PENNSYLVANIA

International Personal Computer Owners

c/o James B. Cookinham
IPCO Inc.
P.O. Box 10426
Pittsburgh, PA 15234
(216) 757-1871
CompuServe: 71545467

Harrisburg PC Users Group

c/o Jack Stahl
1195 Fairmont Dr.
Harrisburg, PA 17112
(717) 652-9097

Microcomputer User Group (MUG)

The Pennsylvania State University
Computation Center
Computer Building
University Park, PA 16802

Philadelphia Area IBM PC Club

c/o Bennett Landsman
2041 Harbour Dr.
Palmyra, NJ 08065
(609) 786-1441

Pennsylvania IBM Group

c/o Ron Kester
1018 Greenlawn Dr.
Pittsburgh, PA 15216
(412) 381-2898

RHODE ISLAND

Rhode Island PC Users Group

c/o Mike Mahoney
University of Rhode Island
Tyler Hall
Kingston, RI 02881
(401) 792-2301

SOUTH CAROLINA

Palmetto Personal Computer Club

P.O. Box 2046
Columbia, SC 29202

TENNESSEE

IBM PC User Group

c/o Ross Burrus
Science Applications, Inc.
Plaza Tower, #801
Oak Ridge, TN 37830
(615) 482-6649

Memphis Area IBM-PC Users' Group

c/o Peter Vermilye
P.O. Box 241756
Memphis, TN 38122
(901) 345-8760

TEXAS

Bay Area Personal Computer Organization (BAPCO)

c/o Earl Rubenstein
P.O. Box 58098
Houston, TX 77058-8098

Centex PC Users Group

c/o Patti Anderson
P.O. Box 10169
Austin, TX 78766-1169
(512) 458-6996

Houston Area League of PC Users

c/o Duane C. Hendricks
P.O. Box 610001
Houston, TX 77208
(713) 831-3367
(713) 772-1371

Fort Worth IBM-PC Users Group

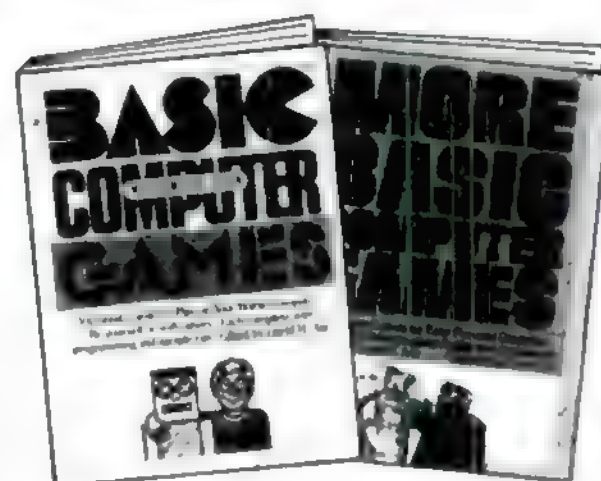
c/o Bill Rosenthal
P.O. Box 16100
Fort Worth, TX 76135
(817) 249-3327

Dallas-Fort Worth User Club

c/o Samuel P. Cook
309 Lincolnshire
Irving, TX 75061
(214) 253-6979

(Texas listing to be continued in Volume 4 Number 5.)

GAME BOOKS FROM CREATIVE COMPUTING



BASIC COMPUTER GAMES, Micro-computer Edition, edited by David H. Ahl. Here's a great collection of 101 fascinating games, all written in easy-to-use Microsoft BASIC. Play Craps, Combat, Super Star Trek, Lunar LEM Rocket, Gomoko, Checkers, Boxing, Bowling—and 93 others! With an introduction, notes on Microsoft BASIC, and conversion instructions for other BASICs, 8 1/4" x 11", softcover, illustrated, with an index. 183 pp. \$7.95 (\$1.50). #6C

MORE BASIC COMPUTER GAMES, edited by David H. Ahl and Steve North. In this sequel to *Basic Computer Games* you'll find 84 challenging new games, complete with sample runs, program listings and illustrations. All run in Microsoft BASIC. Race your Ferrari, become a millionaire, joust with a knight, crack a safe, and more! Conversion table to other BASICs included. 8 1/4" x 11", softcover, illustrated, 200 pp. \$7.95 (\$1.50). #6C2
TRS-80 Microcomputer Edition, \$7.95 (\$1.50). #6C4

TRS-80 is a registered trademark of the Radio Shack Division of Tandy Corp.

CREATIVE COMPUTING PRESS Dept. FE2C
39 East Hanover Avenue, Morris Plains, New Jersey 07950

Send me the books listed below

ITEM NO.	QTY.	TITLE	PRICE EACH	P&H* ()	TOTAL
CA, NJ and NY residents add applicable sales tax					
Outside USA add \$3 for regular postage and handling per order					TOTAL AMOUNT

CHECK ONE

☐ PAYMENT ENCLOSED \$_____

☐ CHARGE MY

☐ American Express ☐ MasterCard ☐ Visa
(Charge and phone orders \$10 minimum)

Card No. _____ Exp. Date _____

Mr. Mrs. Ms. _____
(please print full name)

Address _____ Apt. _____

City _____

State _____ Zip _____

For faster service, CALI. TOLL FREE: 800-631-8112.
(In NJ call 201-540-0445)

Also available at your local bookstore or computer store

COMPUTERS and more...

is your place to buy for **SELECTION, SERVICE and SAVINGS.**
We know that your needs are not the same as everyone's, so we don't treat you "just like every one else."
Your needs are special. That's why **COMPUTERS and more...** is your place to buy for...



"Tomorrow's Technology at Prices You Can Afford Today"

COMPUTERS

IBM	
256 PC w/2	1550
PC/10 Meg 1-32WK	1995
PC w/dual & 10 Meg	2745
New At	On Sale!
Warranty Included!	
APPLE	
Hot New IIC	CALL
MAC-All Models	CALL
LISA-All Models	CALL
Apple IIE	CALL
LEADING EDGE	
PC-1	1395
PC-2	1549
PC4	1956
PC5	2349
PC6	2695
Nutshell	119
COLUMBIA	
MPC 4210	1895
MPC 4220	2079
MPC 4620	3359
MPC 4820	3795
MPC 4750	4129
VP 2210	2059
VP 2116	1276
TELEVIDEO	
TPC-II	On Sale!
1605 Color	CALL
PM/16	CALL
ACCESSORIES	
IBM	
Hercules Color Card	199
Vutek CPS Cd	229
Keytronic 5151 - 5151 37	209
Bi Graphics I	459
Bi Graphics II	289
Smart Cable by J.Q.	64
Jr. Extender by	
Falcon	CALL
UltraPak by TSENG	48
UltraRam by TSENG	199
Multidisplay by PS	239
Plantronics Color Plus	299
Orchid Blossom	299
Orchid PCnet	389
Orchid Combo	CALL
AST 6 PAK	
Quad Link	239
PC Saver	459
TG Joystick	39
64K Ram Chips	44
CALL FOR PRICE LIST!	
APPLE	
Disc Washer Car	199
PrinterFace by P.P.	64
Graphcard by P.P.	79
2.80 Card	69
Touch Pad by Koala	84
MicroSoft Access	CALL
Grappler Plus	109
Videx 80 Col w/St Switch	179
Wesper Full Graphics	78
System Saver FAN	87

**WE'VE
EXPANDED
TO A NEW LOCATION
TO SERVE YOU BETTER**

**NEW NEVADA
LOCATION!**

**680 GREENBRAE DR., #234
SPARKS, NEVADA 89431**

**CALL
TOLL-FREE 1-800-621-0852 ex 988
NO SALES TAX!**

All prices subject to change and availability
Apple, IBM are registered trademarks

PRINTERS

JUKI	
Juk1	389
Tractor	109
6300	CALL
EPSON	
RX-80	219
FX Series	CALL
LQ 1500	1059
DAISYWRITER	
Daisy 200	859
New Models	CALL
PANASONIC	
1090	219
1091	279
1092	399
1093	589
Ribbons (with purchase)	8
QUADRAM	
QuadJet	695
IBM Kit	19
Apple Kit	49
NEC	
New Pinwriter 2	CALL
New Pinwriter 3	CALL
2030-Parallel	679
2050-Parallel	889
3510-RS232	1299
3515-RS232	1299
3530-Parallel	1279
3550-Parallel	1599
Extended Warranties	CALL
TOSHIBA	
Toshiba P1351 P	1259
Toshiba P1351 S	1259
Toshiba P1340 ser	749
Toshiba P1340 Par	749
MANN-TALLY	
Spirit	294
160-1	539
160-L	619
180-1	769
180-L	849
420-L123	2369
420-L-112	1939
CITIZEN	
MSP-10	394
MSP-15	649
Ribbons, Supplies at Low Prices	CALL
STAR	
STX-80	137
Gemini 10X	239
Gemini 15X	349
Delta 10	339
Delta 15	469
Radix 10	494
Radix 15	567
X-War Avail All Models	
OKIDATA	
MicroLine 84 P	CALL
MicroLine 92 P	CALL
Pacemark 2350 P	CALL
Pacemark 2410 P	CALL

**FREE
SHIPPING**

MODEMS

HAYES	
II C Compatible w/St	259
MicroModem IIE	229
Hayes 1200B	389
SmartModem 300-RS232	219
SmartModem 1200-RS232	539
ChronoGraph RS232	199
U.S. ROBOTICS	
IBM PC Modem	369
Password 300/1200	357
VEN-TEL	
1200 Plus	384
RIXON	
R 103J ASYNC	229
PC 212A IBM Internal	429
PC 212A WA	
w/ASYNC Port	499
R 212A-J RS232	429
NOVATION	
Access 1-2-3	399
J Cat	99
103 Smart Cat	189
212 Auto Cat	997
Apple Cat II	229

DISK DRIVES

FLOPPY DRIVES	
Tandon 100-2	169
Shim Line Drives	149
Apple Compatible	159
FUJI DISKETTES	
SS DD	22
DS DD	27
HARD DISK	
10 Meg Internal	895
QuarterMaster	ON SALE!
10 Meg External	1095
15 Meg External	CALL
Bernoulli by Iomega	2799
QUADRAM • TECMAR • CONTROLL DATA	

SOFTWARE

FOR PC & XT	
OZ by Fox & Geller	299
Quick Code	219
FrameWork by	SALE!
dBase III	419
Friday	199
Please by Hayes	CALL
Lotus 1-2-3	275
Mayday by Teletek	CALL
Symphony by Lotus	SALE
Upgrades for 1-2-3	CALL
DESQ	CALL
Invest Anyt by Dow Jones	
Market Analyzer	249
Market Manager	219
PFS: Access	65
PFS: File	89
PFS: Write	89
PFS: Report	84
Bankstreet Writer	47
EasyWriter II by IUS	269
Dow Jones Soft	CALL
Volkswriter Delux	179
R-Base by MicroRim	319
WordStar	ON SALE!
MBSI Real World	CALL
TIM	329
VersaForm	279
Call for Complete Price List	
APPLE	
dBase III by Ash/Tate	419
Friday by Aston-Tate	199
Bottom Line Strategist	269
C Dex Packages (ea.)	39
CPA Modules 1 thru 4	
	(each) 174
OZ by Fox & Geller	319
Graphox	197
Sales Edge	174
Format II	104
Knoware	64
Master Type	27
Micro Pro	CALL
Micro Soft	CALL
PFS: Access IIE	49
PFS: File II	84
PFS: File IIE	84
The Handlers (all)	149
Terrapin Logo	99
VersaForm	259
BPI GL	267
Pie Writer by Hayden	97
Persona Pearl	194
Dow Jones	CALL
Lock Smith	78
Zork-I, II or III (ea.)	26
Deadline	33
Flight Simulator II	37
Jack Report	74

MONITORS

Roland DG-121-G	139	Quadscreen w/Card	1650
Roland DG-121-A	249	Zenith 131	319
Roland CB-141	319	Zenith 135	487
Roland CC-141	595	Zenith 122	109
Taxan 420	389	Amdek 310	159
Taxan Amber	119	Amdek Color IV-T	597
Taxan 415	499	NEC JC 1215	269
TGB-80 col IIE	139	NEC JC 1216	397
RGB Card IIE	89	Amdek 300 G	134
Quadchrome	559	Amdek 300 A	144

TERMINALS CALL

SERVICE

**WE OFFER EXTENDED
WARRANTIES ON ALL OF
OUR PRODUCTS. OUR
EXPERIENCED
TECHNICIANS
ARE HERE
FOR YOU!**

COMPUTERS and more.....

8265 Commercial Dr., La Mesa, CA 92041

MasterCard

VISA

For CA, HI and Alaska (619) 466-4895

**P.O.'S ACCEPTED
ON APPROVAL**

HARDWARE

PERSTOR Hard Disks

A line of expansion hard disks in 12-, 20-, 26-, and 40-megabyte capacities, each with a 5-megabyte removable Winchester cartridge. Among the models are TOP SECRET, which features dual removable cartridges allowing all data to be removed from the system for security, and an XP option, which includes an expansion chassis with a 130-watt power supply.

Each PERSTOR system includes cabinet, power supply, controller, cartridge, ca-

ble, software, and manuals.

(List Price:

\$2,795-\$5,495, depending upon model)

Systems and Software, Inc.
7825 E. Redfield Rd., #C
Scottsdale, AZ 85260
(602) 948-7313

CIRCLE 722 ON READER SERVICE CARD

EXSELL

A hardware/software package for sales, marketing, and telemarketing professionals. EXSELL combines the data management functions of its software with an auto-dialing telephone to create an automated telemarketing workstation.



EXSELL, Excalibur Sources, Inc.

The EXSELLERATOR phone includes a built-in speakerphone and a jack for a separate headset. The features permit the user to make calls without having to touch the phone, thus leaving the hands free.

The EXSELL software organizes the user's customer and prospect database, providing rapid access to a variety of stored information for each prospective call. Information that can be called up prior to a call includes a personal profile, contact history, comment file, and two user-definable history fields. The personal profile allows the user to store six user-defined codes, the date of "next" and "last" contacts, plus brief user notes.

An incorporated "tickler" feature reminds the user when prospects are to

be contacted for follow-up and offers a simple method for updating the status of each call. Once contact is made, the contact history is automatically updated and a follow-up report is generated to ensure that the promised action for a client has been taken. EXSELL includes data search facilities and can generate a variety of reports and mailing lists. It also interfaces with most word processing systems.

(List Price: Complete system, \$750; software only, \$495)

Requires: 128K RAM, two 320K drives, PC-DOS, asynchronous communications adapter.

Excalibur Sources, Inc.
P.O. Box 467220
Atlanta, GA 30346
(404) 395-0306

CIRCLE 732 ON READER SERVICE CARD



PERSTOR Hard Disks, Systems

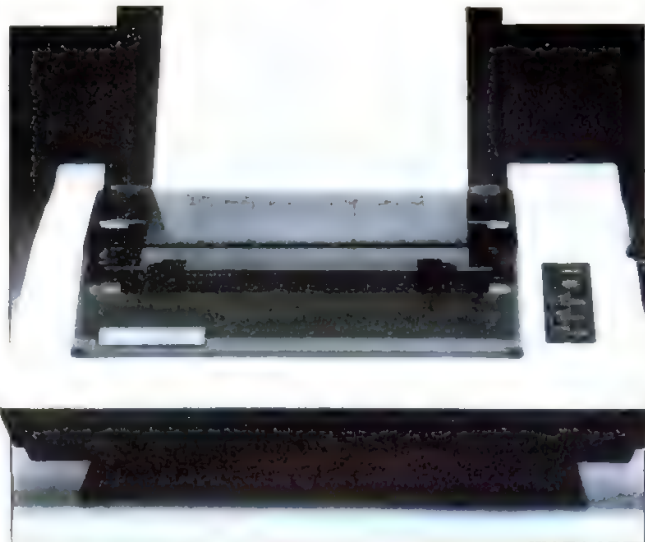
and Software, Inc.

HARDWARE

Axiom GP-550PC

A low-cost dot matrix printer with draft and near-letter quality print modes. In draft mode, the printer is capable of speeds up to 86 characters per inch with six different character sets: pica, expanded pica, elite, expanded elite, condensed, and expanded condensed. In its near-letter quality print mode, the Axiom GP-550 operates at 43 cps with additional character sets: italic, expanded italic, superscript, subscript (standard or expanded), proportional, and expanded proportional. In graphics mode, the unit produces a resolution of 16 vertical dots.

The printer has both pin-feed and friction feed, plus bottom feed for label forms. It uses replaceable ribbon and ink cartridges.



Axiom GP-550PC, Axiom Corp.

(List Price: \$299; with interface, \$319)

Axiom Corp.
1014 Griswold Ave.
San Fernando, CA 91340
(818) 365-9521
TWX: 910-496-1746

CIRCLE 735 ON READER
SERVICE CARD

Access PC

A portable, two-way communications system allowing the user to input data from remote locations via radio transmissions. Access PC consists of a receiver module that links to an RS-232 asynchronous communications (COM1) port in the user's system and a separate handheld transceiver keypad with LED readout. The receiver interface appears as a modem to the user's system, translating incoming radio transmissions into



Access PC, Accumation

readable digital code.

Included with the system are an inventory management program and linkable software modules for using Access PC with the user's own BASIC, C, or assembly programs. Also included are software interfaces for a number of popular applications software such as *dBASE II*.

(List Price: under \$5,000)

Requires: 128K RAM, one disk drive, PC-DOS 2.0, asynchronous communications adapter.

Accumation
P.O. Box 855248
Richardson, TX 75081
(214) 690-3233

CIRCLE 739 ON READER
SERVICE CARD

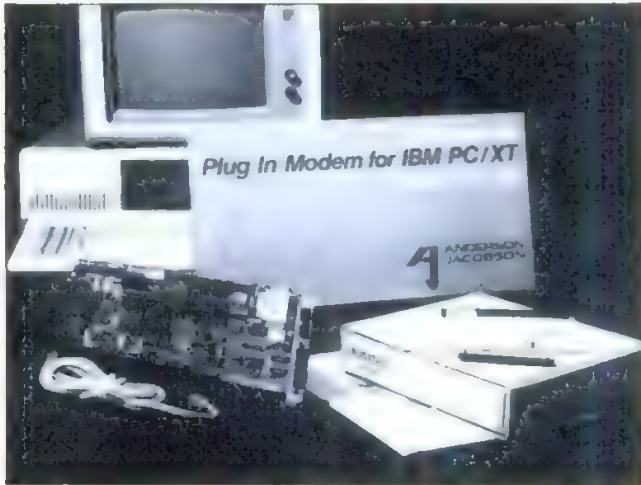
Info-Mate 1200

A standalone, 1,200-bps modem conforming to

Hayes protocols. Features include auto-dial/auto-answer modes and auto-speed selection. The modem also has a built-in speaker so the user can monitor the progress of auto-dialed calls.

The Info-Mate 1200 also allows the user to turn down the volume of its speaker, in which case the unit sends messages to the user's screen (CONNECT, BUSY, RINGING, VOICE, for example). The quiet call-progress messages also enable an electronic mail system to deliver messages unattended overnight.

The modem can operate in either asynchronous or 1,200-bps synchronous communications modes, and can multiplex voice and data communications



PC Connection, Anderson Jacobson

on the same line.
(List Price: \$595)
Cermetek Microelectronics, Inc.
1308 Borregas Ave.
P.O. Box 3565
Sunnyvale, CA 94088
(408) 734-8150

CIRCLE 734 ON READER
SERVICE CARD

PC Connection

A plug-in modem board capable of operating at 300 or 1,200 bps in Bell 103/113 or Bell 212A protocols. It features full- or half-duplex operations, as well as auto-dial/auto-answer modes, and pulse or tone dialing. Two modular jacks permit both voice and data communications through one system.

Also included on the board is an asynchronous communications adapter, eliminating the need for a separate async port while allowing simultaneous data

capture and printing while recording. Bundled with the board is the *Crosstalk XVI* communications program, allowing up to 40 user-programmable function keys to speed communications procedures.
(List Price: \$495)
Anderson Jacobson
521 Charcot Ave.
San Jose, CA 95131
(408) 945-9030

CIRCLE 737 ON READER
SERVICE CARD

SCORBOT-ER III

An educational hardware/software system for learning robotics. Included within the package is the SCORBOT robot, a controller unit with RS-232 interface, and disk-based educational software.

The centerpiece of the educational package is the SCORBOT robot arm, which realistically emulates the capabilities of industri-

al robots through its physical design and the functionality of the ELITE language. The robot has a DC servo motor drive, operates on five axes, and is equipped with a gripper mechanism. The robot's controller unit has eight inputs and eight outputs that allow the robot to interact with external devices.

The *SCORBOT-ER III* software consists of four modules, ranging from a study of robotic fundamentals through more-advanced engineering concepts and experimentation. The program's curriculum combines the use of textbooks, hands-on activities, and audio-visual materials for classroom use.
(List Price: \$3,625)
PREP, Inc.
1007 Whiteshead Rd. Ext.
Trenton, NJ 08638
(609) 882-2668

CIRCLE 719 ON READER
SERVICE CARD

SOFTWARE

Rental Manager

A general-purpose property management program that handles all tenant activities, automatically posting a built-in general ledger. The flexibility of the program allows the user to determine the level of complexity, from simple control of receipts and disbursements by property, to more complex financial reporting for owners with several properties. *Rental Manager* also features interfaces to popular spreadsheet and word processing software.
(List Price: \$750)

Requires: 128K RAM, two disk drives, PC-DOS.
Coleman Business Systems
3654 Arcadian Dr.
Castro Valley, CA 94546
(415) 581-7125

CIRCLE 729 ON READER
SERVICE CARD



SCORBOT-ER III, PREP, Inc.

SOFTWARE

GPSS/PC

An implementation of the *General Purpose Simulation System (GPSS)* modeling language originally developed for mainframe systems. *GPSS/PC* provides a simulation environment making it possible to predict the effects of managerial or engineering decisions on complex real-world systems. A prior familiarity with the mainframe version of *GPSS* is required for the most effective use of the micro version.

(List Price: \$900)

Requires: 256K RAM, one 320K drive, PC-DOS. *Minuteman Software*
P.O. Box 171
Stow, MA 01775
(800) 343-0664
(800) 322-1238 in Mass.

CIRCLE 715 ON READER
SERVICE CARD

Perishables Management System (PMS)

A menu-driven program for small to medium-size independent supermarkets. *PMS* provides management facilities for controlling meat, produce, and deli departments within a supermarket or within a wholesaler's distribution center, from which several stores can be controlled.

The software allows the user to analyze in detail the profitability of departments via a variety of reports. Information that can be ob-

tained via reports include tonnage, store sales, department sales, customer counts, labor costs, and other factors affecting the day-to-day business of a supermarket's operations.

Also included with the program is a separate module for performing meat-cutting tests, allowing the user to compare three different pricing levels at once before cutting.

(List Price: \$2,800)

Requires: 256K RAM, 10-MB hard disk, PC-DOS 2.0. *Supermarket Data Systems, Inc.*
95 Spring St.
P.O. Box 398
Auburn, ME 04210
(207) 782-5061

CIRCLE 726 ON READER
SERVICE CARD

ASSIST/I

A program that allows IBM System/370 Assembler language applications to be written, assembled, and executed on a PC.

ASSIST/I supports an operationally complete subset of the System/370 Assembler, providing the pseudo-instructions XREAD, XPRINT, XDEC1, and XDEC0. An interactive debugger is automatically invoked either upon abnormal program termination or at user-defined breakpoints, allowing the user to view and modify the application program's memory area, registers, and Program Status Words (PSW). *ASSIST/I* will also display tables of an application's last ten executed instruc-

tions or branches; it can dynamically set and clear breakpoints and can execute instructions one line at a time.

Included with the software is a full-screen text editor that uses familiar *WordStar* commands in a nondocument mode. The source listing and output of user-created programs are written to disk where they can be read through the use of the *ASSIST/I* editor or any other host utility.

(Initial Fee: \$1,600; yearly thereafter, \$1,200)

Requires: 128K RAM, one drive, PC-DOS 2.0. *Overbeek Enterprises*
P.O. Box 726
Elgin, IL 60120
(312) 697-8420

CIRCLE 728 ON READER
SERVICE CARD



GPSS/PC, Minuteman Software

SOFTWARE

Fontrix 2.0

A graphics program making use of extended disk-accessing techniques to create graphics images that can be up to 1.8 megabytes in size while needing only the normal 16K RAM used by the PC to display a graphics image. *Fontrix 2.0* includes three modules—Graphic Writer, Font Editor, and Graphic Printer—to facilitate the drawing, typesetting, and printing of created images. All of the program's functions are menu-driven, with a list of pertinent commands displayed on-screen. Help screens are available at any time with the press of a single key.

The Graphic Writer module commands and coordinates the virtual graphic worksheet, allowing text and graphics images to be merged easily. Features such as italics, boldfacing, and negative type are accessible from the software's menus with single keystrokes. The drawing and painting routines accept input from either the keyboard or a mouse, and objects or the cursor can be positioned both visually and by *x* and *y* coordinates. The Graphic Writer's imaging tools include 96 foreground/background patterns, elastic lines and boxes, freehand drawing, and rectangular area fills,

as well as the ability to capture, move, and duplicate portions of a screen.

Fontrix 2.0's Font Writer module allows the user to custom-design fonts. The editor provides a 48-by 48-pixel character cell size to facilitate the creation of a new character, and features such as copy and overlay simplify the creation of similar characters.

The third module, the Graphic Printer, dumps single and extended graphics screens to a range of popular printers, including Epson, Mannesmann Tally, Okidata, IBM, and C. Itoh. Features include independent horizontal and vertical magnifications, 90-degree rotation, negative image, justifications, and multiple copies.

In addition to the main *Fontrix 2.0* package, preprogrammed font libraries, called *Fontpaks*, are available as companion disks. Each *Fontpak* contains an additional 10 fonts.

(List Price: \$125; Fontpaks, \$20 each)
Requires: 256K RAM, one disk drive, PC-DOS 2.x, color/graphics adapter.

Data Transforms
616 Washington St.
Denver, CO 80203
(303) 832-1501

CIRCLE 708 ON READER
SERVICE CARD

The Factory

A logic and problem-solving game for students in grades 4 to 9. Using color graphics and animation, the game places students in the role of a design engineer, challenging them to create geometric "products" on a simulated machine assembly line they create.

Compatible with the IBM PCjr, *The Factory* is layered with three difficulty levels. Students work through each level, learning to analyze a process and to work backwards and understand sequence, logic, and efficiency.

(List Price: \$55)
Requires: 64K RAM, one disk drive, PC-DOS 2.1.
Sunburst Communications Inc.
Pleasantville, NY 10570
(914) 769-5030

CIRCLE 710 ON READER
SERVICE CARD

JAWS

A dental practice management system for the PC-XT, capable of organizing patient records, accounts receivable, appointment scheduling, and more. *JAWS* can prepare patient billing statements instantly, with all charges noted and all discounts (such as for senior citizens, union plans, etc.) taken into account. It can also perform income analyses for a practice by pinpointing sources of revenues and produce

correspondence through a built-in text editor.
(List Price: \$2,100; demo disk, \$150)

Requires: 256K RAM, 10-MB hard disk, PC-DOS 2.0.
Pentasoftware Corp.
1992 Yonge St., #301
Toronto, Ont.
M4S 1Z7 Canada
(416) 485-8267

CIRCLE 725 ON READER
SERVICE CARD

PC Mail Order System

A set of programs for managing a mail order business. Included utilities allow the user to log sales and print sales data reports (including tax liabilities), to print sophisticated mailing labels tied to the database, and to maintain inventory control.

Sales can be logged into the system's database by item, date, customer, serial number, quantity, tax rate, discount rates, and prices. Inventory control information that can be kept under the *PC Mail Order System* includes stock on hand, stock on order, and reorder/purchases data.
(List Price: \$295)

Requires: 64K RAM, two disk drives, PC-DOS.
*Data*Easy*
12 Skylark Dr., #18
Larkspur, CA 94939
(415) 927-0990

CIRCLE 717 ON READER
SERVICE CARD

SOFTWARE

Compiler Assist Program (CAP)

A utility program for IBM Pascal programming. *CAP* analyzes the results from PAS1 and PAS2, setting the DOS ERRORLEVEL after each pass. This allows a batch file to check the ERRORLEVEL from one step before continuing on to the next. If errors are found, the compiler screen output is locked until the user has examined it. Also included with the software is a utility that allows a batch file to prompt the user for the actions to be taken upon a PAS1 or PAS2 failure.

(List Price: \$27.50)

Requires: 128K RAM, one disk drive, PC-DOS 2.0, IBM Pascal Compiler. *Slick Software*
P.O. Box 641
Harrisburg, NC 28075
(704) 455-5927

CIRCLE 731 ON READER
SERVICE CARD

MISys

A manufacturing inventory system geared to the needs of small to medium-size businesses. *ISys* provides inventory control, multiple-level bills of material, and an integrated purchase order processing system. The software can produce over 40 different management reports. Designed to be functionally compatible with the *Easybusiness* line of software from Informa-

tion Unlimited Software, *MISys* integrates directly with the *EasyFiler* database management system.

(List Price: \$995; demo disk, \$100)

Requires: 128K RAM, two disk drives, PC-DOS. *Microcomputer Specialists, Inc.*
18 Lyman St.
Westboro, MA 01581
(617) 366-1200

CIRCLE 716 ON READER
SERVICE CARD

Type Processor One

An interactive typesetting program allowing text to be composed via a "what you see is what you get" display. *Type Processor One* consists of two integrated modules: text processing (formfill) and composition. The text processor allows the user to "draw" sets of columns on the screen with indents and runarounds. The program will then accept ASCII text from any word processing program to fill these columns, automatically justifying and hyphenating from a 20,000-word dictionary.

The composition module displays simulated type on the computer screen. The user can directly change size, type font, position, and so forth, "draw" horizontal and vertical rules for generating complete forms, and "cut and

paste" blocks of type.

Output can be sent to typesetters either through a direct RS-232 serial link or over the phone. Hard copy can also be generated locally for proofing purposes.

(List Price: \$4,995)

Requires: 256K RAM, two disk drives, PC-DOS. *Bestinfo, Inc.*
33 Chester Pike
Ridley Park, PA 19078
(215) 521-0757

CIRCLE 733 ON READER
SERVICE CARD

Flow Charting

Software to create, edit, store, and print out programming flowcharts and organization charts. *Flow Charting* includes two text fonts, standard flowcharting symbols, and three distinct types of lines. Using full-screen editing techniques, the user

can create a chart, then print it on any standard dot matrix printer.

(List Price: \$167)

Requires: 128K RAM, one disk drive, PC-DOS, color monitor, color/graphics adapter. *Patton and Patton*
340 Lassenpark Cir.
San Jose, CA 95136
(408) 629-5044

CIRCLE 724 ON READER
SERVICE CARD

Marvel Print

A utility designed to simplify the use of extended printing features of the Okidata Microline printer. The user replaces printer control codes with standard keyboard characters, as data are entered with any word processor or other software. *Marvel Print* converts the standard keyboard characters into the appropriate control se-



Type Processor One, Bestinfo, Inc.

SOFTWARE • ACCESSORIES

quences as the data are printed.

Commonly used codes, such as underlining, enhanced, emphasized, pica, elite, condensed, data processing mode, correspondence mode, and so forth, require only one character to be embedded in the text. Less common codes, such as formatting commands, require two characters. Because standard characters are used, such word processing functions as global search and replace can easily be done on the printer codes.

Marvel Print can produce microjustified text even with double-width characters. All features of the Okidata Microline printer are supported, including variable line spacing, vertical and horizontal tabs, and ASCII graphics. (List Price: \$70)

Requires: 64K RAM, one disk drive, PC-DOS, Okidata Microline printer. **Marvel Software**
1922 Ave. N
Brooklyn, NY 11230
(718) 336-2323

CIRCLE 709 ON READER
SERVICE CARD

The Registrar

A registration and logistics management program for in-company training programs and similar institutions. The software includes functions for enrolling students, estab-

lishing students' statuses, and printing class rosters and student transcripts. Logistics functions include keeping track of instructor assignments, course supplies, confirmation and completion letters, invoices, and so forth.

The Registrar can merge class and student information with form letters created by the user on an outside word processor. Reports that can be prepared and printed wholly within the software include alphabetical listings of classes and students, class rosters, transactions logs, and management reports. The program can also export data in ASCII, DIF, and dBASE II formats for use with outside programs. (List Price: \$835; demo disk, \$50)

Requires: 128K RAM, two disk drives, PC-DOS. **Silton-Bookman Systems**
4966 El Camino Real,
#101
Los Altos, CA 94022
(415) 967-2660

CIRCLE 712 ON READER
SERVICE CARD

Sexware

A sex education program with over 200 multiple-choice questions on a range of sex topics. Intended primarily as entertainment, the program produces a Sex IQ score based upon answers entered.

(List Price: \$29.95)

Requires: 64K RAM, one disk drive, PC-DOS.

Challenge Software Co.
134 W. 32nd St., #602
New York, NY 10001

CIRCLE 727 ON READER
SERVICE CARD

ACCESSORIES

Calc/Pad

A pad of preruled spreadsheet work forms, intended to aid in working out a spreadsheet's structure and contents before

entering data at a keyboard. The Calc/Pad form offers 20 rows by 8 columns, printed on both sides. Each pad contains 50 sheets of 8½-by-11-inch paper punched to fit regular three-ring binders. (List Price: \$4.75 per pad) **Compu-Quote**
6914 Berquist Ave.
Canoga Park, CA 91307
(818) 348-3662

CIRCLE 706 ON READER
SERVICE CARD

PC Caddy

A portable, self-contained workstation. Features in-

ROW	COL	A	B	C	D	E	F	G
1	ASSETS							
2	Accts. Receivable	1000	1050	1050	1050	1050	1050	1050
3	CASH	0.25	0.25	0.25	0.25	0.25	0.25	0.25
4	UNPAID	0.25	0.25	0.25	0.25	0.25	0.25	0.25
5	GOODS	0.25	0.25	0.25	0.25	0.25	0.25	0.25
6	TOTAL ASSETS	SUM(B5:D5)	SUM(E5:G5)	SUM(H5:I5)	SUM(J5:M5)	SUM(N5:Q5)	SUM(R5:U5)	SUM(V5:Y5)
7	LIABILITIES							
8	Accts. Payable	20	20	20	20	20	20	20
9	STOCKS	50	50	50	50	50	50	50
10	LABOR	100	100	100	100	100	100	100
11	MATERIALS	1000	1000	1000	1000	1000	1000	1000
12	TOTAL LIABILITIES	SUM(B10:D10)	SUM(E10:G10)	SUM(H10:I10)	SUM(J10:M10)	SUM(N10:Q10)	SUM(R10:U10)	SUM(V10:Y10)
13	NIST	89-017	89-017	89-017	89-017	89-017	89-017	89-017

Calc/Pad, Compu-Quote

ACCESSORIES



PC Caddy, Omnium Corp.

clude individually adjustable keyboard and monitor platforms, vertical storage of the IBM PC's systems unit, and heavy-duty casters. Constructed of heavy-gauge chrome and black steel, the PC Caddy can support any monitor weighing less than 50 lbs. and having a footprint not exceeding 9¼ by 15½ inches.

(List Price: \$99)

Omnium Corp.

203 N. Second St.

Stillwater, MN 55082

(800) 328-0223

(612) 430-2060

CIRCLE 711 ON READER
SERVICE CARD

Platinum Series Diskettes

A premium-quality, universal diskette that can be used with any type of 5¼

diskette drive. The diskettes feature two data-protect notches and two index holes, allowing single-sided drive owners to flip the disk for data storage on both sides. The Platinum diskettes can also be used on double-sided drives, even those capable of storing data in quad-density. (List Price: Box of 10 disks, \$55)

Capitol Data Systems

1750 N. Vine St.

Los Angeles, CA 90028

(213) 462-6252

CIRCLE 730 ON READER
SERVICE CARD

Transport Stationery Feeder

A cut-sheet paper holder made of thin, flexible vinyl. The Transport Feeder holds letterhead stationery, preprinted forms, and other individual sheets of paper for printing on a tractor-feed printer. Once the

sheets have been mounted, they are held by the printer mechanism.

The Transport Stationery Feeder is available in 25-sheet and 50-sheet lengths. (List Price: 25-sheet model, \$29.95; 50-sheet model, \$59.95)

Richard L. Kaye

& Co., Inc.

666 Dundee Rd., #1103

Northbrook, IL 60062

(312) 564-8860

CIRCLE 736 ON READER
SERVICE CARD

Kleen Line Conditioners

A line of portable power conditioners available for 250-, 500-, 1,000-, and 2,000 watt loads. The devices can produce an output of 120 volts AC ($\pm 3\%$) from a line input voltage varying from 90 to 140 volts AC. With their 3% sine wave output, the Kleen Line Conditioners

provide continuous protection against spikes, surges, and line noise.

(List Price: 250 watts,

\$292; 2,000 watts, \$977)

Electronic Specialists, Inc.

171 S. Main St.

Natick, MA 01760

(617) 655-1532

CIRCLE 713 ON READER
SERVICE CARD

PC AIRFLO

A fan/filter unit designed to fit the vent openings of the IBM PC's systems unit. The PC AIRFLO device mounts on the user's PC with a clear acrylic bracket and supplies filtered air into the PC to help cool internal expansion boards and components. Motor speed can be adjusted to supply forced, clean air at rates of up to 46 cubic feet per minute.

The unit uses any kind of air conditioning filter material. It does not require power from the PC's



Platinum Series Diskettes, Capitol Data Systems

ACCESSORIES • PUBLICATIONS

power supply because it includes its own line cord. An optional version, using the three-wire Canadian standard, is available by special order.

(List Price: \$97.94)

**ABC Computer
Peripherals, Inc.**

77 Columbia St.
New York, NY 10002
(212) 477-1890

CIRCLE 777 ON READER
SERVICE CARD

TOUCHSTONE 1

A dedicated plug-compatible numeric keypad. The TOUCHSTONE 1 includes a separate cursor control pad and Space, Backspace, Home and Enter keys, plus a full set of math keys, including percent and brackets for compound math formulas. The standalone pad compliments the IBM PC keyboard.

Developed as a productivity tool for spreadsheet, accounting, and other number-intensive applications, the numeric keys are in the familiar calculator pad layout. The keypad's cable ends in two DIN connectors. One of the connectors plugs directly into the keyboard jack of the user's system. The other mates with the standard keyboard's DIN plug for combined operation. In this manner, both keyboards are active at all times, and data may be entered from either keyboard.

(List Price: \$169.95)

Touchstone Technology Inc.

955 Buffalo Rd.
P.O. Box 24954
Rochester, NY 14624
(716) 235-8358

CIRCLE 784 ON READER
SERVICE CARD

Portable PC Computer Bag

A carrying case for the IBM Portable PC, Compaq, and other similarly sized systems. Combining the protective qualities of a hard case with the convenience of a soft case, the Portable PC Computer Bag features a large, zip-down front panel and heavy-duty reinforced handles and shoulder strap.

(List Price: \$139.95)
**Kiwi Division
Northern Mercantile, Inc.**
6721 N.W. 36th Ave.
Miami, FL 33147

CIRCLE 751 ON READER
SERVICE CARD

Voyager Anti-Piracy Devices

A line of microprocessor-based devices designed to prevent unauthorized use of software. The devices connect to the RS-232 serial port of the user's system and automatically determine the baud rates of data on the line.

Model SP200 works in conjunction with the program to be protected by supplying, upon request,



Portable PC Computer Bag, Kiwi Div., Northern Mercantile, Inc.

two unique 64-bit codes from its internal ROM. The first code verifies that the correct SP200 unit is in place in the user's system. The second code is normally used as a key to encode and decode data. However, it can be used by software in other ways, as determined by the user.

Model SP200-64 has 64 pairs of software-selectable codes available in internal ROM. Other models in the line are designed to contain parts or all of encrypted programs, with 1K to 64K bytes of available user memory.

The devices are designed so that when not transmitting codes, data passes through the output port of the devices in a transparent mode. To prevent tampering, the devices are made of molded plastic.

(List Price: Available from the manufacturer)

Voyager Development, Inc.
412 S. Lyon St.
Santa Ana, CA 92701
(714) 667-8128

CIRCLE 779 ON READER
SERVICE CARD

PUBLICATIONS

Get the Most Out of CompuServe

A how-to guide to using the CompuServe on-line videotext service. Endorsed by CompuServe Inc., *How to Get the Most Out of CompuServe* gives a complete tour of the service's facilities and offers sections devoted to logging in, passwords and handles, commands used to draw data from the system, the workings of electronic mail, and so forth.

The book, by authors Charles Bowen and David Peyton, includes an on-line survival kit, with an electronic address book for major services, a bibliography of additional study materials, and instructions for reaching the authors through CompuServe.

(Cover Price: \$12.95)
Bantam Books
666 Fifth Ave.
New York, NY 10103
(212) 765-6500

CIRCLE 775 ON READER
SERVICE CARD

PUBLICATIONS



Inside the Personal Computer, Abbeville Press, Inc.

Inside the Personal Computer

A slick introduction to personal computers in general, featuring three-dimensional, pop-up models of a PC's components and peripherals. Designed for the average person, *Inside the Personal Computer*, by author Sharon Gallagher and graphic artist Ron van der Meer, guides the reader through a PC's hardware.

Six spreads open up to explain how a disk drive works, how a CRT screen produces images, how a keyboard works, and so forth. Accompanying charts, diagrams, and illustrations further aid in explaining the fundamental principles of personal computing.

(Cover Price: \$19.95)
Abbeville Press, Inc.
505 Park Ave.
New York, NY 10022
(212) 888-1069

CIRCLE 767 ON READER
SERVICE CARD

The Principles of Data Communications

A primer on data communications written to be useful to people in any stage of expertise. Through case studies and detailed explanations, the author, Richard Dolphin, covers the equipment involved, the interface standards used, and common protocol types of data communications as currently practiced.

(Cover Price: \$59.95)
Carnegie Press
100 Kings Rd.
Madison, NJ 07940
(201) 822-1240

CIRCLE 776 ON READER
SERVICE CARD

Mastering Symphony

An introductory guide into the intricacies of Lotus Corp.'s *Symphony* integrated software. *Mastering Symphony*, by author Doug Cobb, explains the workings of the software's spreadsheet, database man-

agement, word processing, graphics, and communications functions. Cobb provides practical business examples and applications using *Symphony*, as well as comparisons with Lotus's 1-2-3 program.

(List Price: \$24.95)
Sybex
2344 Sixth St.
Berkeley, CA 94710
(415) 848-82333
Telex: 33-6311

CIRCLE 740 ON READER
SERVICE CARD

Soft-Kat Educational Software Guide

A comprehensive guide to over 600 educational programs from 55 manufacturers. *The Soft-Kat Educational Software Review Guide* is divided into sub-

ject areas such as math, reading, and science, and presents each program with a description and a photo of an actual screen.

The guide also provides one-page reviews of selected programs, with ratings for graphics, color, sound, content, and other categories. Prepared by Dr. Lawrence Lowery, an educational software specialist at the University of California, the reviews also provide specific data on hardware compatibility and target age groups.

(Cover Price: \$14.95)
Soft-Kat, Inc.
15015 Oxnard St.
Van Nuys, CA 91411
(818) 781-5280

CIRCLE 772 ON READER
SERVICE CARD

New on the Market Submission Guidelines

1. Please include the retail price, distribution methods, and details of both hardware and software requirements needed for an end-user to properly use your new product. For software especially, this includes required amount of RAM, number and type of disk drives, operating system(s) supported, and any peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more information about a product than is typically included in an ad.
3. Include telephone contacts for marketing and technical questions.
4. If available, include black-and-white glossy photos of the product, 4 x 5 in. or larger.

Please note that all products are run on a space-available basis. It is impossible to guarantee publication of a product announcement for any particular issue.

Inclusion in **New on the Market** is at the exclusive discretion of the editor.

PC BlueBook

Rates and Information

PC: BlueBook is a high-response, low-cost source for advertising in the fastest growing computer market in the world. Advertisers choose between set categories and may include a logo. Display advertisers may cross-reference to their current display ad.

Circulation: 250,000 Paid Circulation Rate Base.
Readership: 750,000 Est.

AD STYLE

1 line Heading (25 characters maximum). 7 lines Body Copy (45 characters per line). 4 lines for Company name, address and telephone.

RATES

Per Issue: \$200. Additional Lines: \$20 per line. Logos: \$125 per issue. Minimum Order: 4 times within 6 issues period. Terms: Prepayment is required. Check, money order, American Express, Diners, VISA or MasterCard are accepted.

DEADLINES

February 8th for the April 16th issue, on sale March 26th. Send your ad and prepayment to: PC BlueBook, Classified Advertising, 12th Floor, One Park Avenue, New York, NY 10016. Advertising sales: (212) 503-5115. Customer service: (212) 503-4506

ACCESSORIES

SUPPLIES

OUR EVERYDAY PRICES

64K RAM sets (set of 9) \$35.00
5¼" Dysan DSDO disk \$29.90/Box
(Special box contains 11 Dysan disks)
Call for quantity discounts



WGGB
316 N. Owen Street
Mount Prospect, IL 60056
(312) 392-2621

IBM STYLE BINDERS, SLIPS

Complete program packaging line. D-ring cloth binders, slip cases, floppy pages, game portfolios. Continuous paper with three large holes. 20 lb. to go in binders. Blank disk envelopes. Function key cards tell user your F1-F10 meanings. Low prices on floppy disks. Call, write for prices. Catalog. Fast service, low prices.
ANTHROPOMORPHIC SYSTEMS LIMITED
376 E. St Charles Road
Lombard, IL 60148
(312) 629-5160

KEYTOPS/KEY OVERLAYS

Touchdown™ full-size keytops enlarge major control keys on IBM and most compatibles: state model and color: black or IBM grey. \$21.95. Touchdown™ key overlays available for 5251, 5520, Displaywrite 2, Wordstar, Lotus 1-2-3 and most popular software, plus do-it-yourself kits. \$6.95-\$29.95.
US orders postpaid.
HOOLEON CO. DEPT. 88
P.O. Box 201
Cornville, AZ 86325
(602) 634-7517

BUSINESS OPPORTUNITIES

PACKAGE YOUR SOFTWARE

IBM Value-Added Dealer for PC, XT, AT seeks mutually beneficial business relationship with vertical market software development firms. Increase sales and profitability by selling your software and IBM hardware as a system. The Pre-Loaded and tested package can be drop-shipped to customers. Other sales and marketing services available. Reply to:
P.O. Box 612
San Mateo, CA 94401

COMPUTER REPAIRS

IBM PC/XT/PPC REPAIR

Circuit boards and electronic sub-assemblies professionally repaired on ATE (Automatic Test Equipment). An alternate solution, with lower pricing and fast turnaround. Dealer & Maintainer packages available. From keyboard to power supplies. Call:
UNITRACE INCORPORATED
3350 Scott Blvd, Bldg. 20
Santa Clara, CA 95054
Area 408 727-7573

COMPUTER TRAINING

MICROREF™

QUICK REFERENCE GUIDES

GIVES YOU COMPLETE SOFTWARE COMMANDS AND PROCEDURES IN SECONDS! Thumb-indexed, easy-to-follow steps, built-in easel, durable plastic pages, illustrations, glossary & index. MICROREF Wordstar, Multiplan, VisiCalc, SuperCalc/\$14.95 each. MICROREF Lotus 1-2-3/\$16.95. Your satisfaction is guaranteed. Order toll-free (800) 323-6043/in Illinois (800) 942-6077.



EDUCATIONAL SYSTEMS, INC.
1000 Skokie Boulevard
Wilmette, IL 60091
(312) 256-4750

VIDEO TUTOR

"How to use your PC in 10 easy video lessons for the IBM PC & XT." An award-winning video providing keyboard, disk formatting, operating systems, software applications & an intro to BASIC. Retail \$79.95 & \$3.50 s/h, in BETA & VHS. Software titles available soon. Ask about our custom video & interactive video-disc.
KENNEN PUBLISHING
150 Shoreline Hwy. Bldg. E
Mill Valley, CA 94941
(800) 428-7777; (415) 332-5828 in CA.

DISKETTE COPY SERVICE

DECADE OF SERVICE 3½•5¼•8

Guaranteed fast turnaround for duplication and formatting on high quality OEM diskettes. Virtually all formats: Commodore, Apple, IBM PC, Kaypro, DEC, Atari, plus many more. Serialization, state of the art copy protection and custom packaging available. Personalized service is our specialty.
COMPUTER MEDIA PRODUCTS
5482 Complex St., Suite 110
San Diego, CA 92123
(619) 565-7802

BLANKET ORDER SERVICES

Diskette duplication, packaging, stocking and drop-shipping services based on your long-term needs. Place a blanket order with releases as you need them for large or small quantities at a fixed price. No extra charge for "mastering", label printing or application.
STAR-BYTE, INC.
2564 Industry Lane
Norristown, PA 19401
(215) 539-4300

9 TRACK TAPE TO DISKS

Conversion from ASCII or EBCDIC 1600 BPI magnetic tape to PC-DOS 5¼ diskettes. New high speed automated process verifies transfer. Quality guaranteed. Only SIX CENTS per thousand characters. \$95 minimum. Other conversion available.
ASI INC.
1259 El Camino Suite 260
Menlo Park, CA 94025
(415) 323-6338

BLUEBOOK

ALLENBACH INDUSTRIES, INC.

Allenbach created the industry, and we've since been imitated—but never duplicated. Copies supplied on OEM quality Allenbach LIFETIME GUARANTEE diskettes, now available in a variety of colors. Virtually all formats and systems. Copy protection, serialization, downloading and packaging available. Rapid delivery on 100 to 1,000,000 copies.



ALLENBACH INDUSTRIES, INC.
2101 Las Palmas, Suite A
Carlsbad, CA 92008
(800) 854-1515, (619) 438-2258

"EACH A PERFECT ORIGINAL"

Duplication, formatting, & downloading for virtually all computer formats. CP/M 8" or 5¼" to IBM PC. We're the experts of IBM duplication. Copy protection, serialization, packaging & shrink wrapping available upon request. Competitive turnaround times. We've earned our reputation for being the best.

DisCopyLabs
1600 Wyatt Drive, Suite 10
Santa Clara, CA 95054
(408) 988-0438

PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer, when our equipment is designed solely to duplicate disks and verify their perfection 100%? Over 600 formats including Commodore 64. Plus serialization, copy protection, labeling, packaging, shrink-wrapping and fast, personalized service.



WESTERN TRANSDATA, INC.
1701 E. Edinger Ave. A-7
Santa Ana, California 92705
(714) 547-3383 (Collect)

PACKAGING & FULFILLMENT

Superior diskette duplication and anti-copy protection, colored diskettes, art/graphics design, camera ready prep, assembly, shrink wrapping. IBM style linen binders/slipcases, vinyl binders, 2 pocket folders, plastic disk albums, display packs, disk pages, mailers, labels, ship cartons.

INPUT/OUTPUT MANAGEMENT
8 East Worcester St.
Worcester, MA 01604
(617) 755-0900

HARDWARE

ADD-ON BOARDS

FIXED DISK BIOS/BOOT

FIXT boots from DATAMAC, DAVONG, XEBEC, PERCOM, GREAT LAKES, ZOBEX, others. Adds XT-like BIOS interface for your disk to IBM PC or COMPAQ. Plug-in installation. DOS 2.0/2.1 reqd. Specify controller model with order \$70 + \$3 shpg. + tax. MC/VISA. (Optional volume support at additional cost.)
GOLDEN BOW SYSTEMS
P.O. BOX 3039
San Diego, CA 92103
(619) 298-9349

FONT-MAKING ON MONO CRT

IN SERVICE 10/84 (MAJOR U.S. NEWS MEDIA). Create, save new characters; SEE, edit your customized text ON-SCREEN; print the same. Transparent to software. Utility disk; 1 slot IBM PC/AT/XT using Epson FX/MX, Oki 92/93. MONO, also col/graphics card; for DOS 2.0+. \$199.95 (+ \$10 foreign sh/h) & NJ tax.
The FontTableaux™ Group
PO Box 2253
Princeton, NJ 08540-0253
(609) 683-4453

IEEE-488 INTERFACE

Halfsize IEEE-488 interface and software turns your PC, AT or compatible into an instrumentation work station for the lab, test, and measurement. We are the major OEM supplier with interfaces for 10 different architectures and the most comprehensive coverage of operating systems and languages. \$395 software \$75.
NATIONAL INSTRUMENT
12109 Technology Blvd. Dept PC
Austin, Texas 78727
(800) 531-5066 or (512) 250-9119

DISCOUNT 64K RAMS

\$29.00 for set of 9
25-100 \$3.20 ea
100-250 3.10
250+ Call
Multifunction Board 0-382K @ \$199 Top Quality w/Full Guarantee COD/Cashiers Check—\$5 ship chg.
PC/RAMS
608 Albert Way
Petaluma, CA 94952
(707) 778-1905

HCLOCK REAL TIME CLOCK

With dClock clock/calendar, you'll never again have to enter the date and time when starting DOS. Easy to install. Does not use an expansion slot. For the IBM PC, PC/XT, or COMPAQ. \$59.95 + \$1 shipping/handling (\$4 s/h outside U.S.). TX residents add sales tax. Checks or MasterCard or VISA accepted (with number, expiration date, and signature). Mail to:
MICROSYNC, INC.
POB 116302
Carrollton, TX 75011

HARDWARE

DISK DRIVES

SMD HARD DISK CONTROLLERS AND SUB SYSTEMS

Interphase brings you the most powerful disk controller and disk subsystems available for your IBM PC or PC compatible. You can use any of the dozens of high performance Disk Drives supporting the industry standard SMD Interface. Capacities range from 16 to 1600 Megabytes, speeds 3-5 times the 5.25". Winchester and reliable removable media too. Ideal for network file servers or large DBM applications.
Interphase Corp.
2925 Merrell Road
Dallas, TX 75229
(214) 350-9000

HARDWARE

DISKETTES

DISCOUNT DISKETTES

DYSAN SS/DD \$21/10, DS/DD \$26/10. ECHO (lifetime guarantee). SS/DD \$15/10, DS/DD \$19/10. 3M DS/DD \$22/10 (lifetime warranty). Cash—deduct 3%. S&H \$3. \$1.50 credit on long-distance phone orders over \$50. VISA/MC, COD (+ \$2). Ill. res. add 8% tax. Write for free price list & computer book list.
SCAMP SYSTEMS, INC.
Box 59451
Chicago, Illinois 60659
Phone: (312) 267-9859

5¼" DISKS (20% FREE*)

SS/DD 20 ea. 100 ea. DS/DD 20 ea. 100 ea.
* XIDEX \$1.69 1.61 2.06 1.96
DATALIFE \$1.79 1.70 2.25 2.14
* MAXELL \$1.79 1.70 2.29 2.18
DYSAN \$2.05 1.95 2.55 2.45
* SPEC-20% FREE XIDEX & MAXELL FOR QTY OF 50 S&H \$3 Qty 100 or Fract., COD \$1.65-Cash, MO.
A&A COMPUTER CO.
32 Nassau Drive
New Hyde Park, NY 11040
1-(800) 535-2346 OUTSIDE NY, 516-248-8131 IN NY

BULK DISKS DS/DD \$1.05

SS/DD 95¢. In quantities of 50. All disks are 5¼". All disks include LIFETIME WARRANTY and come with Tyvec sleeves, reinforced hubs and write-protect tabs. Shipping \$3.00 per each 100 or fewer disks. NY state res. add sales tax. Check or M.O. Call for boxed disks and hardware prices.
COMPUTER BROKERAGE INTERNATIONAL
Post Office Box 2100, Dept PC-A01
New York, New York 10185
(718) 263-9500

HARDWARE

PERIPHERALS

BAR CODE READER SUBSYSTEM

Consists of Bar Code wand, Decoder unit, cable to connect to Async port on IBM PC/XT or other compatibles, and interactive SW pack & Doc. Unit reads high, med., low density Bar Codes. Code 39 UPC, EAN, 2 of 5, 12 of 5, Codabar, Ames, Code 11, others. Various Baud rates. \$895. Dealer pricing available.
DATAFLOW TECHNOLOGIES, INC.
8422 Bellona La., Suite 303
Towson, MD 21204
(301) 296-2632/666-2366

BAR CODE READERS/MAGNETIC STRIPE READERS

TPS provides Bar Code and Magnetic Stripe Readers and combinations of these for simple installation on IBM PC, PCjr, DEC Rainbow, Professional VT200 series terminals, NCR Decision Mate V, TI Professional, etc. They connect between the keyboard and the PC so that no card slot or programming is required. \$695-\$995.
TPS ELECTRONICS
4047 Transport Street
Palo Alto, CA 94303
(415) 856-6833

HARDWARE

POWER PROTECTION

SURGE SUPPRESSORS

Protectall™ surge suppressors protect your computer from voltage spikes. Two models, each with 6 outlets, monitor light, ivory case and 2 year warranty. Appx. 3.5" x 5". Components UL listed. PRO-1 plugs into wall socket, \$29.95; PRO-2 w/ master, on/off switch, 6' cord, \$49.95. Add \$2 handling OH res. + 5.5% tax. Visa/MC/CK.
PAXTON PRODUCTS, INC.
1101 Paxton Rd. Ste. 7
Cincinnati, OH 45208
(513) 321-0400

MEIRICK STAND-BY POWER

THE MEIRICK STAND-BY POWER SYSTEM provides back-up power & protection from power failures, brownouts, surges, spikes, and power line noise. The enclosed battery will keep a computer running for greater than 20 minutes during a power failure. 400 watt system—\$495; 800 watt system—\$795.
MEIRICK, Inc. POWER SYSTEMS DIVISION
Box 298
Frisco, CO 80443
(303) 668-3251

BLUEBOOK

HARDWARE

STORAGE DEVICES

SRI WINCHESTER SUBSYSTEMS

Internal 10 MB hard disk for IBM PC. WESTERN DIGITAL controller. Tested & formatted, complete kit \$1050. No change in BIOS, boot from hard disk. Simple to install like a floppy, DOS 2.0. Several installed, 1 year factory warranty. Additional 10 MB hard disk \$750. Tape back-up & removable HD systems available.

SRI DATA SYSTEMS
9 East Pleasant Avenue
Maywood, NJ 07607
(201) 684-4518

9 TRACK TAPE CONTROLLER

Read and write 1/2 in. 9 track magnetic tape. Gain access to the most widely used media for information exchange in the world. Use with Pertec compatible (Cipher, etc.) formatted tape drives at speeds up to 120 ips. Run with MS-DOS or PC/IX! Complete with interconnect cables and software. List \$880 + shipping.

OVERLAND DATA INC.
5644 Kearny Mesa Road, Suite A
San Diego, CA 92111
(619) 571-5555

MAILING LISTS

IBM MAILING LISTS

Now over 687,000 micro owners. Select by brand: 194M Apple, 129M IBM PC, 152M TRS-80, 80M Commodore and more! 9 phone verified reseller lists including 5183 stores, VAR's, chain buying offices, Canadian and more! 12,500 computer companies. Lists by software brands. Printer models, schools, publications, etc. Over 75 different micro and mini lists. Call or write for FREE catalog. Include phone and type of company.

Irv Brechner
TARGETED MARKETING INC.
Box 5125
Ridgewood, NY 07451
(201) 445-7196

PUBLICATIONS

CATALOGS

PC BUYERS GUIDE

THE INDEPENDENT GUIDE TO PRODUCTS AND SERVICES FOR IBM Personal Computers. This master directory lists, describes, rates for ease of use, and tells you about the latest in software, hardware, accessories, supplies, books, services, et al. Everything for you and your IBM PC. It even includes an Index of Computer Camps for both adults and children. From the publishers of PC. An ideal gift at only \$7.95 (+ \$1.55 shipping/handling) to U.S. destinations; and \$11.00 elsewhere. Residents of CA, CO, CT, DC, FL, IL, MA, MD, NJ, and NY add applicable sales tax. Checks or MasterCard or VISA acceptable (with number, expiration date and signature). U.S. funds only. Mail to:
PC BUYERS GUIDE
CN 1914
Morristown, NJ 07960

SECURITY

PASSWORD CONTROL YOUR PC's

PC LOCK II allows file by file password and encryption protection. With the lock in place, your computer will not boot without entering a correct PW. Ideal for small multi-user environments. XT FORMAT wipeout protection. A 5" x 4" card with diskette, 38 changeable passwords. KEEP YOUR PC STRICTLY PERSONAL.

PC Lock II

MPPI, LTD.
2200 Lehigh Rd
Glenview, IL 60025
(312) 998-8401

NEW! LOW COST XT SECURITY

LOCK-IT-\$129.95 PC or XT (specify). Prevents BOOT-UP until user-chosen PW is entered. Special features-hardware device, optional hard-disk-ONLY boot; optional timed relock. ALSO AVAILABLE: PC RESET (XT or PC) with QUICKON (fast boot plus true reset). \$89.95. EASY installation. MC/VISA
SECURITY MICROSYSTEMS CONSULTANTS
16 Flagg Pl., Suite 102 PC
Staten Island, NY 10304
(718) 667-1019

SOFTWARE

ACCOUNTING

ARCHITECTS AND ENGINEERS

AEMAS System is designed specifically for architects, civil engineers & other professional firms where monitoring project costs is required. Modules available are job costing, payroll, A/R, A/P, general ledger & automatic invoicing. Interactive modules stand alone or run in any combination. Contact Bill Fraedrich.
DATA-BASICS, INC.
11000 Cedar Rd. #110
Cleveland, OH 44106
(216) 721-3400

DBJA PAYROLL CONTROL

Now even the most complex payroll is simple with this easy-to-use menu-driven program. Calculates all taxes and supports multiple wage rates or salaries and user-defined deductions. Prints checks, W2's, reports (current period, YTD summary, etc.) in order by name, employee #, SSN, or zip. Extensive error protection, foolproof data entry, password. Tax updates, minor customizing and full phone support included. Compatible. \$300 complete.
D.J. BAILEY ASSOCIATES
3438 West 83rd Place
Chicago, IL 60652
(312) 434-6658

CUSTOM PAYROLL

All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance. Prices start at \$695.00 for basic system and manual.
DATASMITH, INC.
Box 8036
Shawnee Mission, KS 66208
Phone: (913) 381-9118

CONSTRUCTION ACCOUNTING

CMAS system is designed specifically for commercial contractors where tracking job costs is required. Five modules available are job costing, Payroll, A/R, A/P, and general ledger. Interactive modules run stand alone or in any combination. Contact Jeff Kilb.
Data-Basics Inc.
1100 Cedar Road #110
Cleveland, OH 44106
(216) 721-3400

SOLID ACCOUNTING PACKAGES

\$50 PER PACKAGE

• General Ledger • Payroll • Inventory • Accounts Receivable • Accounts Payable \$150 PER PACKAGE • Accountants Client Writeup
These are professional, proven packages! Requires PC/MS-DOS 2.1 + 128K RAM. Price includes MANUAL. Telephone support available. Above prices are prepaid, shipping included. We accept cash, check or money orders.
MCBS.
12703 Stuebner-Arlene #202
Houston, TX 77014
(713) 583-6828

INTERACTIVE BUSINESS SYSTEM

Integrated software package includes A/R with Order Entry/Commissions & Point-Of-Sale, A/P, Inventory Control/Bill of Material & PO, auto calculating payroll & G/L with Fixed Assets. 53 detailed reports, audit trails & automatic posting from all modules. Floppy or hard drive. Free brochure. Demo & Manual \$25.



PEP ENGINEERING
390-M Oak Ave
Carlsbad, CA 92008
(619) 434-6023

ACCOUNTANTS SOFTWARE

Finally! A software source for the practicing accountant with programs designed especially for the professional practitioner. Tax Planner, Depreciation, After-The-Fact Payroll. Form #1099 Generator, Account Analysis and Client Information System are just a few of many. Call or send for our complete catalog.
OMNI SOFTWARE SYSTEMS, INC.
146 North Broad Street
Griffith, IN 46319
(219) 924-3522

BOOKKEEPING MADE EASY

Fast, flexible, single entry checkbook accounting system in (C). Audit trail is built into normal use. Special built in safeguards to prevent errors. Allows 999 accounts with budgets, 729 departments, or charge cards, bank reconciliations, prints checks. Demo \$10 complete \$95.00. Micro-One-Write™
PERMAR & ASSOC.-DEPT. PCM
1125 Sunnyhills Rd
Oakland, CA 94610
(800) 443-0100 ext. 644

ADVERTISING AGENCIES

Billing, accounting, and management software specifically for growing ad agencies. Produces media and production invoices, monthly statements, aging reports, time analysis, client/job P&L, vendor checks, and detailed financial statements. PC/XT and AT compatible. 100+ ad agency users. Billing modules start at \$1495. Seven-module integrated package \$5995. Demo with complete documentation \$150.
MICROBASE SOFTWARE INC.
PO Box 34163
Indianapolis, IN 46234
(317) 241-9699

PRACTICING ACCOUNTANTS

Ten of the top 12 CPA firms use Accountants Microsystems, Inc. Software for Professionals. DATAWRITE™ client write-up allows custom reports, packs mainframe power onto your micro. Expand your practice with Fixed Asset Management, Post Facto Payroll, Practice Management and the TAX MACHINE™. Nationwide Training/Support.



ACCOUNTANTS MICROSYSTEMS, INC.
3633-136th Place SE
Bellevue, WA 98006
(800) 426-8201, (206) 643-2050

SOFTWARE

BUSINESS

TIME ACCOUNTING & BILLING

TABS is designed for use by professionals who bill on the basis of time (attorneys, accountants, etc.). User-friendly data entry and menu-driven program selection makes TABS easy to understand and operate. STI's full-feature software is currently in use by over 1,000 firms nationwide. For details contact:



SOFTWARE TECHNOLOGY INC.
620 No. 48th, Suite 120
Lincoln, NE 68504
(402) 466-1997

BLUEBOOK

MILP88 MIXED INTEGER LP

A GENERAL-PURPOSE system for solving mixed integer linear programs with up to 45 integers, 255 constraints and 1255 variables. Solves problems by applying the branch and bound method. Menu-driven with many useful features similar to LP88. Requires 192K. \$99 with 8087 support, users guide. VISA/MC. EASTERN SOFTWARE PRODUCTS, INC. PO BOX 15328 Alexandria, VA 22309 (703) 549-5469

INVOICER PLUS

Menu-driven billing & accounts receivable management system. Produces Invoices, Aged Statements, Invoice Journals, Receipts Journals, Aged Customer Account Status, Packing lists, etc. Available with modifiable source code for dBASE II users or as a stand-alone package. (no source code) \$199. Each VISA/MC. DATAMAR SYSTEMS 819 Gage Dr. San Diego, CA 92106 (619) 223-0444

CALENDAR—SAVES TIME

FAST, graphic, effective time management. View year, month, week or day. Edit, copy, insert, delete, search and print time related information. Maintain multiple calendars on a single diskette. Store/repeat commands. Help. Requires PC-DOS 2.0, 128K, Mono or color. Send \$85 (check or M.O.) for "KGcalendar." KGourley Enterprises Inc. Dept. MA1 PO Box 180760 Austin, TX 78718

INVESTWARE™

A portfolio management software system offering the investment manager automatic pricing of securities via telecom., comprehensive reports for clients & managers, report generator, interface w/LOTUS 1-2-3, yr-to-date record keeping, tax mgmt., unconfirmed trade monitoring, cross reference reports, 800 hotline #, + numerous features incl. a word processing interface. Base package \$795. & up. NEMS 345 Whitney Avenue New Haven, CT 06511 (203) 787-3452

PC ACCOUNTING SYSTEM

Professional Accounting for small business or home use. No codes to forget: all lookups are alphabetic. Shows effect of each entry on the screen in English. Supports 20 business units 1000 account codes, and 10,000 customers or vendors. Reports by business or consolidated in detail/summarized on screen/printer. Color/mono dual floppy/hard disk \$99.95. (VISA/MC/Check/COD/MO) NYS add 7% Tax. PEGASUS SYSTEMS INC., Dept P 30 Harbour Pointe Buffalo, NY 14202 (716) 852-2969

Datamar "JOB COSTING"

Menu driven system monitors cashFlow and all job transactions. Provides multi-level burden rates & labor/material types. Tracks change orders. Reports job status, labor distribution, etc. Interfaces with most popular accounting packages. PC/DOS. VISA/MC \$395.00 DATAMAR Systems 5055 A North Harbor Drive San Diego, CA 92106 (619) 223-3344

DATA CARE™/FAST XT BACKUP

New user program lets your XT fly! Backs up a full 10-megabyte hard disk to diskettes in 22 mins—any type/number of files. Better verification. No more data loss. Optimum use of your time and equipment. Nothing to learn: Works just like your DOS Backup. 30-day unconditional guarantee. \$129.00 VISA/MC. ELLICOTT SOFTWARE, INC. 3777 Plum Hill Court Ellicott City, Maryland 21043 (301) 465-2690

MACRO*TRACK

EARLY WARNING ECONOMIC FORECASTING

Totally new for managers. Fast, easy, automatic forecasts of the entire economy, quarter by quarter, 3 years in advance. Designed for detecting next major turning points. Self contained 20 year database of most used business indicators. Unique algorithm outperforms all other forecasting methods. \$224.95. Demo Disk \$10.00. BLACK RIVER SOFTWARE 118 N. Marshall Street, Suite 150 Winston-Salem, NC 27101 (919) 924-6389

TIME TRACK

TIME TRACK is a time recording and billing system that converts time spent by people within an organization into invoiced amounts. The system is menu driven for ease of operation. Online help screens supplement an extensive user guide. The license price of TIME TRACK is \$495.00.



DOMUS Software Limited
251 Cooper Street
Ottawa, Canada K2P 0G2
1-(613) 230-6285

THE DESK ORGANIZER \$145!

Lowest price ever! While inventory lasts. The critically acclaimed program from Warner Software. Performs important desk management functions even while you are in other software! Runs alongside best selling software. Special offer includes future enhancements, tutorial disk, quarterly newsletter. 30-day guarantee. \$145 or request free information. Visa/MC/accepted. HI TECH Box 803-BL Meno Falls, WI 53051 (414) 274-9229

MYTE MYKE™ BUSINESS SYSTEM

Commercial grade, integrated business application software. Order Entry, Inventory Control, Sales Analysis, Accounts Receivable, Accounts Payable, General Ledger, Purchase Orders. Pro-Time—time and billing. Supports single, multi-user and networked microcomputers operating under MSDOS, PCDOS, CP/M, UNIX, and others. Installation and support available.



M & D SYSTEMS, INC.
3885 North Buffalo Rd./P.O. Box 108
Orchard Park, NY 14127, (716) 662-6611

LP88—LINEAR PROGRAMMING

A powerful menu-driven system for solving linear programs with up to 255 constraints and 2255 variables. A new product-form version accepts problems up to 510X2510. Features include interactive and batch operation, spreadsheet-style input and editing, a storage system for problems and bases, sequential file input/output, Simplex algorithm restart, a complete report generator, sensitivity analysis. Requires 192K. \$99 with 8087 support, user's guide. VISA/MC. EASTERN SOFTWARE PRODUCTS, INC. POB 15328 Alexandria, VA 22309 (703) 549-5469

ANALYTIC DECISION MODELS

DSM is an integrative modeling system supporting multiple regression, linear/integer + quadratic programming, EOQ inventory, queuing & break even modeling (all simulation based); time series, PERT/CPM. Sensitivity analysis, data management, page forward/backward & other features. \$395. Demo diskette \$15. DECISION SYSTEMS SUPPORT, INC. 31871 Via Puntero San Juan Capistrano, CA 92675 (714) 493-3639

CALENDAR PLUS

A time management system that displays activities in block calendar; prints calendar for selected range of activities, times, personnel or locations, print calendar extracts in tabular lists; merges separately maintained calendars. Much more. PC-DOS/MS-DOS versions. 192K, any printer \$155.00. INTERNATIONAL SOFTWARE SOLUTIONS 3355 Lenox Road, Suite 750 Atlanta, GA 30326 (404) 233-1519

SOFTWARE

BUSINESS OPPORTUNITIES

WRITERS—AUTHORS

Want to write your own microcomputer book? We're looking for writers who want to make money for their hobby. Be published by one of the largest, oldest microcomputer book publishers. Obtain your computer needs list or send your own idea by writing to our editorial dept. TAB BOOKS, INC. Blue Ridge Summit, PA 17214 (717) 794-2191

SOFTWARE

BUSINESS PROJECT MANAGEMENT

MicroGANTT

Control your project! You describe the work, MicroGANTT calculates the schedule and budget. Time management, resource allocation, project tracking, personnel billing and fixed cost capabilities. Flexible critical path charts. Unlimited size and scope. PC—DOS, MS—DOS, CP/M—80. Free brochure. Demo available. EARTH DATA CORPORATION P.O. Box 13168 Richmond, VA 23225 (804) 231-0300

MCBA JOB COSTING SYSTEM

Adapted for the IBM PC using MS/DOS, Job Costing is a comprehensive management tool that provides accurate cost reporting & complete variance analysis. Complete interfacing to MCBA'S Inv. Mgmt. Labor Performance, Purchasing, A/R, A/P, G/L & Payroll Packages. Complete documentation. Instal. & support avail. MDM SYSTEMS, INC. 24525 Southfield Road Suite 205 Southfield, MI 48075-2740 (313) 557-1254

PRIMAVERA PROJECT PLANNER™

... the most project management you can get from a micro. Plan and schedule networks of up to 10,000 activities. Level resource use. Control schedule, resources and cost. Call or write to find out why Primavera is used by managers worldwide for improved project performance. Primavera Systems, Inc. Two Bala Plaza Suite 925 Bala Cynwyd, PA 19004 (215) 667-8600 Telex (910) 997-0487

BLUEBOOK

THE AHA! EXPERIENCE

PMS-II, Primavera, Harvard Project Management and Pertmaster Schedules Systems. For managing any complex project-R&D construction, business planning, 2,000-10,000 events on critical path, bar charts, resource managements capacity planning & load leveling. Training also. Put profits on the critical path with Aha! The Project Management Software Specialists Aha! Inc.
109 S. River St., P.O. Box 8405
Santa Cruz, CA 95061-8405
(408) 458-9119

SOFTWARE

COMMUNICATIONS

TELEX LINK SOFTWARE

Link your computer to telex service via ITT, RCA or Western Union with Cawthon's telex software. Designed specifically for telex communications, Cawthon software is easy to use, has on-line help, self-test diagnostics, frequently called numbers, and an excellent User's Guide. Cawthon Software is available for many computers and operating systems.



**Cawthon
Scientific
Group**

CAWTHON SCIENTIFIC GROUP
24224 Michigan Avenue
Dearborn, Michigan 48124
(313) 565-4000 Telex: (810) 221-1265

SOFTWARE

COMPILER

DeSmet C-\$109

Full K & R C Compiler, assembler, linker, librarian, full-screen editor and example software. Both 8087 and floating point libraries. Rated 1st or 2nd in 8/83 BYTE Benchmarks. Newsletter No royalties on generated code. Unlimited updates \$20/each. PC/MS DOS and CP/M-86. \$109 Now available with source level debugger. Price \$159.

C-WARE

1607 New Brunswick Ave
Sunnyvale CA 94087
(408) 736-6905

WIZARD C COMPILER

The power of C with the thorough diagnostics of PASCAL. Full LINT diagnostic integrated with compiler. Full UNIX SYSTEM 3 compatibility. Floating point library; fast compact code; 1 register variable. In-line assembly code. UNIX emulation library. Uses MICROSOFT linker. PC/MS DOS 2.0 only. \$450.00

WIZARD SYSTEMS SOFTWARE

11 Willow Court
Arlington, MA 02174
(617) 641-2379

LATTICE C COMPILER

Get Version 2.1 of the finest 8086/8088 C compiler directly from Lattice. Includes 8087 support, UNIX math library, FORK/EXEC functions. Compatible with MS-DOS 1 and 2. Single-unit price is \$500 VISA/MC accepted. Call for information about corporate licenses and about other Lattice products such as MAKE, GREP, CVUE and WINKJWS.
LATTICE, INC.
P.O. Box 3072
Glen Ellyn, IL 60138
(312) 858-7950, TWX 910-291-2190

SPARRY BASIC—C COMPILER

Powerful basic compiler that means business.
• Instructions support internal ISAM files.
• Four virtual screens, recall time <1 second.
• Use of all memory for basic programs
• 13 significant digit integer math package.
• Demos with tutorial and reference manual.
Price \$159. Quantity discounts.
VISA/MC/CHECK Mass. res. + 5% tax req. PC DOS with 128K demo diskette \$15.
SPARRY SOFTWARE LABS
PO Box 632 #A
Milford, Mass 01757
(617) 473-5435

SOFTWARE

DATA MANAGEMENT

FORM MANAGER

COMBINES data entry, data base forms processing, and spreadsheets. Design forms on screen. Use them for data entry retrieval & calculations. Does data entry validation. Report writer sorts any 3 fields. Prints labels, reports, based on your own criteria. Handles up to 32,767 records. \$195 Demo disk-\$15.00.

BIT SOFTWARE

P.O. Box 619
Milpitas, CA 95035
(408) 262-1054

PC-FILE III™

New for 1985, version 3.0, is faster than ever. Enhancements: 32767 record capacity, field size up to 1665 bytes, instant "snapshot" mailing labels, much more. Exchange data with 1-2-3, WORD, WordStar, etc. Over 100,000 copies of PC-File in use. Printed manual. \$49 check, M/C or VISA. Toll free 24 hour order line: 1-800-JBUTTON

BUTTONWARE

PO Box 5786
Bellevue, WA 98006
(206) 746-4296

A FRIENDLY FILER

There has NEVER been a filing program easier to use than SeekEasy. NEVER! It uses an advanced "flexible match" algorithm. Just type APPROXIMATELY what you want to find. SeekEasy does the rest. Fast! PC/MS-DOS 2.0. \$87 (demo \$15)—add 6.5% in CA. Add \$3 S&H. VISA/MC O.K. Free brochure & reviews.
CORRELATION SYSTEMS
81 Rockinghorse Road
Rancho Palos Verdes, CA 90274
(213) 833-3462

ZENTOOLS

Intuitive, elegant and powerful. Word processor, spelling checker and spreadsheet software tools for your IBM PC or compatible by author of well-known high ticket packages. Integrated; learn one & learn all. \$29.95 each includes professional documentation and templates.
KNOWLEDGE ENGINEERING, INC.,
Box 3138, #231
Austin, Texas 78764
(512) 328-0100 (VISA/MC)

FOxBASE II

Interpreter/Compiler

dBASE II source compatible • Runs 3-20 times faster than dBASE II • Up to 48 fields per record
• Full type-ahead capabilities • Provides compact object code & program security • Twice as many memory variables as dBASE II • Sophisticated online manual/HELP facility • MS-DOS \$395 AOS/VS \$995



FOX SOFTWARE INC.
13330 Bishop Road, POB 269
Bowling Green, OH 43402
(419) 354-3981

SOFTWARE

DENTAL

DentalWare™

PROVEN Dental Management System—in use 4 yrs. Patient data management, A/R, statements, insurance forms, practice analysis, word processing, recall, delinquent processing, historical data. FLEXIBLE: User designed forms, notices, statements, reports. \$3600. Training included. Dealer inquiries invited.

DATA STRATEGIES, INC.

332 S. Juniper St., Suite 210
Escondido, CA 92025
(619) 489-9218

SOFTWARE

DEVELOPMENT TOOLS

BASIC B-TREE SUBROUTINES

CADSAM is a B-tree keyed file access system. A set of subroutines you merge with your program. Supplied in BASIC source code. Use interpreted or compiled. Files never need sorting. Random search time 1 second. No royalty charge. Compatible accounting programs available. Price \$150. VISA/MC accepted.

CADS, INC.

PO BOX 17304
Greenville, SC 29606
(803) 297-0651

CROSS ASSEMBLERS

The same manufacturer—compatible, relocatable cross—assemblers Microtec has been providing to professional developers since 1974 are available to transform your PC/MS-DOS host microcomputer into a development system. Loaders/communication utilities included. Target families. 80286, 80186, 8096, 8085, 8051, 8048, 68000, 6809, 6800, Z80, 6500, others.



**MICROTEC
RESEARCH**

MICRO-TECH RESEARCH, INC.
PO Box 60337
Sunnyvale, CA 94088
(408) 733-2919

C UTILITY LIBRARY

Don't reinvent the wheel. Save time and do a better job developing your software. Extensive library with source. Best color/mono screen handling available. Windows, graphics, DOS 2 directories and files, keys, printer, communications, date, time, and more. Over 200 functions. DOS/BIOS gate gives you complete control of your PC. Thorough manual with examples. C86, Microsoft, Lattice, Mark Williams. \$149. DeSmet \$99

ESSENTIAL SOFTWARE, INC.

Box 1003
Maplewood, NJ 07040
(914) 762-6605

See AN EDITOR BEST BUY!

See is for programmers. Fastest screens. Fastest load & ready. Easy to learn with On-Screen help, tutorial. 20 active file-windows 256 ch. lines. Char, line, block & file do undo operations. Auto-indent, Wildcard search-replace. No file size limits. Invoke DOS, run a program, return as was. Full-features. Need: PC, jr, XT or AT; 128K; DOS 2.0+. Inquire UNIX version \$69.50 demo \$12.50. PROLOGIC CORPORATION
31324 Via Colinas, Suite 111
Westlake Village, CA 91362
MC/VISA (818) 991-5062

SIMULATE & ASSEMBLE

IBM PC will assemble, program, and simulate Microcomputer code for 8048, 8051, Z8, 7000, 8085, etc. Execute and debug HEX files with unique windowed simulator. Watch your code run. EPROM Programmer available. Assemblers—\$195. Program 8749,8751, 27XX—\$245. Simulator/Debugger—\$395.



CYBERNETIC MICRO SYSTEMS
Box 3000

San Gregorio, CA 94074
(415) 726-3000

BLUEBOOK

CROSS-ASSEMBLERS

Use your desktop computer as a development system with Avocet assemblers—the industry standard since 1980. Available for CP/M-80, CP/M-86, and PC-DOS/MS-DOS host systems, in most popular disk formats. Target chip families: 68000, 6804, 6805, 6809, 1802/05, 8048, 8051, 6502, 6800, NEC7500, F8, Z8, COP400, 8085, Z80. \$200 to \$500.



AVOCET SYSTEMS, INC.
P.O. Box 490
Rockport, ME 04856
(800) 448-8500, (207) 236-9055

IAR MACRO X-ASSEMBLERS

Features: Compatible with chip manufacturers; 132 significant chars in symbols; universal linker; generates absolute or relocatable; cross reference; output in any HEX format. *Z8, Z80, 8085, 8048, 8051, 8096, 6502, 6800, 68,000, 6809, 6805, TI family & others. Price \$250-\$600. MS/PC-DOS & MIN170K. Also on VAX VMS & UNIX. ENERTEC INC
19 Jenkins Ave.
Lansdale, PA 19446
(215) 362-0966 Telex: 824 247

SOFTWARE EDIT

KEDIT

KEDIT is an XEDIT-like full screen editor for the PC. Features include split-screen editing of multiple files, targets, ARBCHAR, SCHANGE, GET-FILE, SORT, prefix commands, wordwrap, block operations, & key redefinition. Needs 80 column display, 192K, DOS2 or later. \$125 plus \$3 shipping. Demo version \$10.
MANSFIELD SOFTWARE GROUP
PO BOX 532
Storrs, CT 06268
(203) 429-8402

SOFTWARE EDUCATIONAL

THE FUTURE IS NOW

MOTHER GOOSE—New generation revolutionary software for young children. Brilliant color graphics, animation and lively music. Instills computer & reading skills & is child proof. Electronic page turning allows your child to experience the wonders of Mother Goose. It's fun, IBM PC/XT & PCjr, \$34.95, VISA/MC.
SUNSTAR SYSTEMS
Route #4, Box 368
Ogdensburg, NY 13669
(315) 393-7117

SOFTWARE FOR EDUCATORS

*TRIVIA COMPUTE—The hottest game is now ready for the PC. Six Challenging categories. User has the option to design his or her own game.
*GRADEBOOK PLUS—complete grading system with statistics for 400 pupils w/60 grades each.
*BRAIN COMPU TEASERS—a unique package w/over 100 brain teasers in science, math and logic.
DEC Computing
Department 120
5307 Lynnwood Drive
West Lafayette, IN 47906

SOFTWARE ENGINEERING

TECHNICAL SOFTWARE

Largest selection of engineering software—CAD, Heat & Mass Flow, structural, Statistical Analysis and much more. Microcomputer programs for Mechanical, Chemical, Civil, Electrical Engineers, Architects, Scientists, Contractors. Send for detailed catalog—Include \$2.00 for postage and handling.
TECHNICAL SOFTWARE INC.
3981 Lancaster Rd., #101
Cleveland, OH 44121

ENGINEERING PROGRAMS

PSI is the foremost producer of serious engineering applications for the PC. PAKS available handle chemical, mechanical, civil and power design & analysis problems. Our catalog is growing daily. Call or write for your free copy. See review PC Magazine, Nov 1983, page 567.
PSI/SYSTEMS
Research Park, P.O. Box 3100
Andover, MA 01810
(617) 475-9030

STRUCTURAL DESIGN

Quick, versatile, interactive structural programs—beams, columns & frames of any material efficiently analyzed & designed. Extremely friendly input & output with optional COLOR graphics. Specify PC configuration and send \$25 for demonstration disk to:
c2b2—software design
763 27th Avenue
San Francisco, CA 94121
(415) 751-1337

OPTISOLVE

Optisolve solves nonlinear systems of equations and maximizes or minimizes nonlinear functions with nonlinear constraint. It has the capability to find all solutions, including complex ones. No programming language is required; the user simply inputs the problem directly in terms of symbolic equations and inequalities. No other package is as powerful. \$195.
OPTISOFT
Franz Suite 203
2920 Domingo Ave.
Berkeley, CA 94705

smARTWORK™

Printed-circuit artwork editor for double-sided boards up to 10" by 16", runs on an IBM-PC. Color display allows complete interactive control over the placement and routing process. 2X artwork can be made on a dot-matrix printer or pen-and-ink plotter. \$895. Write or call for a brochure.



WINTEK Corporation
1801 South Street
Lafayette, IN 47904-2993
(317) 742-8428

PC ENHANCEMENT HANDBOOK

THE IBM PC ENHANCEMENT for SCIENTISTS & ENGINEERS. A How-To-Handbook with answers to all of your questions on PC enhancement. What can be done? How to do it? and how much will it cost? Includes Toll Free Hotline for application assistance & convenient one stop shopping. SPECIAL INTRODUCTORY OFFER \$18.95
CyberResearch, Inc.
P.O. Box 9565
New Haven, CT 06536
(800) 341-2525; (203) 436-2600 (CT)

ENGINEERING MATH PACK

I/EMP is a menu-driven series of BASIC programs for general engineering use, including curve fitting, equation solvers and roots, sorting, probability calculations and units conversion for files. All are interactive and listable. \$65, manual included. Also ask about our interactive, finite difference, thermal analysis program. I/TAS. Free brochures
R.F. WARRINER ASSOCIATES
3838 Carson Street, Suite 300
Torrance, CA 90503
(213) 540-6299

ENG/SCI GRAPHICS

OMNILOT(S) (screen graphics) & OMNILOT(P) (plotter driver) provide integrated engineering/scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, bar, pie, 3-D wire frame & much more! OMNILOT(S) \$135, OMNILOT(P) \$135. Both \$240.
MICROCOMPATIBLES
301 Prelude Drive
Silver Spring, MD 20901
(301) 593-0683

MECH./ELEC./ARCH. DESIGN

Programs for HVAC Loads, Energy Analysis, Energy Accounting, Duct Sizing, Lighting, Short Circuit, Voltage Drop, Pipe Sizing, Life Cycle Costing, Critical Path Method, for CP/M & MS-DOS Computers. Demo disks avail. for each program \$33.00. Send/Call for literature.
ELITE SOFTWARE DEVELOPMENT, INC.
PO Drawer 1194
Bryan, TX 77806
PH. (409) 775-1782, TLX 910-997-6760

SOFTWARE FINANCIAL

CASH FLOW MANAGEMENT

LOOK takes all the what-if power of LOTUS 1-2-3™ and allows the executive to solve problems without programming his computer. It is menu driven and generates common-sized financial statements, ratios, cash flow, trend reports and graphs. Tactical and strategic planning is the focus of LOOK. Dollar and or percentage variables are changed to generate proformas for 5 years or 12 months. \$950.
BAKER HILL & COMPANY
9085 E. Mineral Circle, Suite 210
Englewood, CO 80112
(303) 799-0238

FAMILY FINANCIAL PLANNER

PROPLANR is a LOTUS 1-2-3 (TM) based, menu driven tax, budget and savings forecasting template. PROPLANR produces 3 year monthly and 10 year annual income/tax and expenditure/saving reports, 401-K Savings Plan analyses and graphs. Needs 512K. Send \$195 (template), \$45 (demo) or \$5 (manual) to:
ALLENCRYST TECHNOLOGIES, INC.
101 Beechwood Avenue
Edison, NJ 08837
(201) 549-0126

CORPORATE CREDIT ANALYSIS

EURAMICRO™ is a microcomputer based corporate analysis system—fulfills all corporate analysis needs of financial institutions including historical comparison, & forecast reporting using your own data. Also allows through time sharing or diskette access to EURABANK™—Non U.S. data as well as FDIC & corporate data. Formats are available to cover 12 industries.
Eurastar Division—SLEIGH CORPORATION
P.O. Box 591
Franklin Lakes, NJ 07417
(201) 891-7528

SOFTWARE GAMES

STAR FLEET I

The ultimate in space combat simulations. Features color animation of battles, music, promotions, through ranks. Capture ships, lay mines, launch probes, rescue bases, repair damage, eliminate intruders, more! 98 pg. manual. Req. 128K, 1 drive, 80 cols, \$49.95 + \$2 s/h.
CYGNUS
P.O. Box 57825
Webster, TX 77598
(713) 486-4163

BLUEBOOK

ZORK! MAPS & HINT BOOKS

MASTER THE WORLDS of ZORK 1, 2, & 3, STARCROSS, ENCHANTER, WITNESS, SUSPENDED, PLANETFALL, INFIDEL, DEADLINE, SORCERER or ADVENTURE with our Multi-level and Encoded maps and hints. \$7.50 ea., or 3 for \$21! (Check, M/O or Visa, M/C # & Exp. Date). Designed BY players FOR players. Accurate, Humorous. FAST delivery!
BROKEN TIMBER PRESS, Dept. P
Box 2681
Shawnee Mission, KS 66201
(913) 722-2464 Evenings Sun -Thurs.

SOFTWARE

GAMES EDUCATIONAL

DEFINITION MANIA

A simple but effective & challenging multiple-choice word game aimed at an adult audience but helpful for high schoolers. Features: color, sound, quips, score, playing options, 600 word dictionary, (Amer. or Can.), documentation. Any PC, DOS, BASIC, 1 drive. An excellent gift idea. \$39.95 Entertaining! U.S. Inquiries
FACILEWARE
61 Fourwinds Rd.
London, Ont., Canada N6K-3L1
(519) 473-5812

SOFTWARE GENERAL

BAR CODE GENERATION SW

Create BAR CODE labels with Old 84, 92, 93, Epson X, Trilog printers. Interactive pack. Prints 39, 93, 12 of 5, 2 of 5, Codabar & UPC-A symbologies on 1-3 up label stock Inc./Dec. OCR interpretation—meets LOGMARS regmts. CPM-86, PC DOS—for IBM PC/XT, CDP MPC, other compatibles \$300. Dealer pricing available.
DATAFLOW TECHNOLOGIES, INC.
8422 Bellona La., Suite 303
Towson, MD 21204
(301) 296-2632/666-2366

DVORAK KEYBOARD SOFTWARE

Want a Dvorak Keyboard for your IBM PC? Sure-Stroke translates keystrokes; gives you Dvorak Typing Coach, transfer letters for key tops, manual, self-motivation audio cassette. Works with Lotus, dBase, WordStar, etc. Stop hunting and pecking—Stroke the Dvorak today! \$95.00 plus \$4.00 shipping; Visa/MC AMEX or check.
SEASONED SYSTEMS, INC.
Box 3720
Chapel Hill, NC 27515
(800) 334-5531. (919) 967-5818

RENT PUBLIC DOMAIN SOFT/W

Rent our PC Disk Libraries for 7 days and copy them yourself. Hundreds of useful business, games and utilities FREE FOR THE TAKING!
IBM-PC SIG-Volumes 1-200 \$200.00
IBM-PC "BLUE" 1-59 \$65.00
Rental is for 7 days after receipt, 3 days grace to return. Most credit cards accepted.
NATIONAL PUBLIC DOMAIN
SOFTWARE CENTER
1533 Avohill Drive
Vista, CA 92083
(619) 941-0925. Info (619) 727-1015 24 hr. orders

CHURCH ADMINISTRATION

COMPUCHURCH™ Unequaled Excellence At Low Cost. Superb Software For ALL Of Your Church Admin. Congregation Mgt., Contribution Mgt., Ledger & Word Processing. Available For Most Micros—including IBM PC, DEC Rainbow, Radio Shack III/IV, Tandy 2000, Corona, Sanyo and Zenith. Hardware Available. Dealer Inquiries Invited.
MICROCOMPUTER TECHNOLOGY
& SOFTWARE, INC.
917 Hospital Drive—P.O. Box 596
Niceville, Florida 32578
(904) 678-3328

SHOP CHEAP—EAT SMART

- COUPONOMIZER—Save more money with your discount coupons and rebates 64K.
- DIET ANALYZER—Perfect for weight control, menu planning and special diets. 128K. \$49.95 ea. + \$2.50 s/h. Requires 1 diskette drive, 80 column display and printer. Immediate shipment, 2 week money back trial. A/E, M/C, VISA.

NATURAL SOFTWARE, LTD.
7 Lake St. STE 7E
White Plains, NY 10603
(800) 626-2511, (914) 761-9329 in NY (collect)

SOFTWARE GRAPHICS

35mm SLIDE FROM YOUR PC

COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your printouts behind. Use high resolution color slides at your next presentation. COMPUTER SLIDE EXPRESS \$6/slide. \$30 minimum order.
VISUAL HORIZONS
180 Metro Park
Rochester, NY 14623
(716) 424-5300

ARTPAK™ DRAWING/ANIMATION

Create exciting & colorful animation for store displays, cartoons, educational shows & demos using ARTPAK. Make a bird fly! Or a man jump! Incl. a complete drawing board, probably the easiest to use graphics program available. Many special effects. You can even add music! 128K/C.G. crd \$99. Ask about color printing. See our full page ad this issue.
PalSoftware Corporation
6100 Barrows Dr.
Los Angeles CA 90048
(213) 259-9659

GRAPHIC PRINTER SUPPORT

At last IBM-PC graphic character support for your dot matrix printer. Use the PrtSc key to produce quality scaled dot matrix reproductions of your display on your Epson, IBM, Okidata, IDS, Centronics, DEC, Anadex, Datasouth, Gemini, TI 850, Riteman, Toshiba, NEC 8023, or C. Itoh printers. If your printer is not listed, let us know and we will support it. GRAFPLUS is now available for all versions of PC or MS-DOS and will operate with IBM and Hercules graphics boards, Techmar, and Hercules graphics boards. Technologies, Inc. \$49.95
JEWELL TECHNOLOGIES, INC.
4451-53rd Avenue Southwest
Seattle, Washington 98116
(206) 937-1081

FORTRAN/PASCAL PEN PLOTS

PLOTMATIC: Complete support for H-P, IBM, and HI pen plotters. All primitives available as sub-routine/procedure calls PLUS total 2D plotting support package. Interfaces with GRAFMATIC. Specify compiler (version number) and plotter. \$135 Plotmatic from Micro-compatibles.
Microcompatibles, Dept. P
11443 Oak Leaf Dr
Silver Spring, MD 20901
(301) 593-0683

PRINT SCREEN

Prints reverse video, underlining, high and low intensities and all 256 characters for IBM PC text screens. Graphic screens can be printed in a variety of sizes, vertically or horizontally. A variety of printers are supported. The license price for PRINT SCREEN is \$50.00.



DOMUS Software Limited
251 Cooper Street
Ottawa, Ontario K2P 0G2
1-(613) 230-6285

FONT GENERATOR

Quickly and easily create fonts—then download them to the printer. Supports the OKIDATA (92 & 93), TOSHIBA 1351, or the EPSON LQ printers. FONTGEN (\$125) will run on either monochrome or graphics screen. Ready fonts (\$25) are available. FONTGEN runs on IBM PCs and most compatibles.
H A C, Inc.
216 Whalen Street
Bronx, NY 10471
(212) 796-4534

FORTRAN/PASCAL GRAPHICS

GRAFATIC (screen graphics): 70 Microsoft FORTRAN/PASCAL (3.1, 3.2) IBM 2.0 or DR FORTRAN callable subroutines. Professional graphics power backed by a 100 pg. user manual. 5 packs in one: general utility, 2-D interactive, total 2-D plot support, 3-D plots, 3-D solid models (hidden line removal). \$135. H-P, IBM, HI Plotter? Try PLOTMATIC for complete plotter graphics capabilities. Interface w/GRAFATIC. \$135 Both \$240.00
MICROCOMPATIBLES
301 Prelude Drive
Silver Spring, MD 20901
(301) 593-0683

EXECUVISION™

Make your next presentation effective & memorable with EXECUVISION™ Presentation Graphics System. Pick from library of thousands of prerendered images, or sketch your own. Draw logos, make graphs & charts, add text with 10 fonts, "cut & paste" & animate—all in 64 color combinations. For IBM PC & compatibles.

EXECUVISION

VISUAL COMMUNICATIONS NETWORK

238 Main St.
Cambridge, MA 02142
(617) 497-4000

FLOWCHARTER

EasyFlow is a computer aided flowchart generation tool. Charts up to 5 by 11 shapes in size, automatic line routing, automatic text centering within shapes. 100-page manual plus many more features than we can mention here. Runs with all printers on any MS-DOS or PC-DOS machine. \$49.95 US.
HavenTree Software, Ltd.
RR #1, Box 110
Seeley's Bay, Ontario, Canada K0H-2N0
(613) 542-7270 ext. 50

SOFTWARE HOBBIES

ASTROLOGY SOFTWARE

We have everything from high-accuracy calculation packages for professional astrologers to programs that print multipage natal, forecast, relationship and numerology interpretations for everyone. These interpretation programs include a license to sell the copyrighted text output.
AGS SOFTWARE
BOX 28, Dept. C
Orleans, MA 02653
(617) 255-0510

BLUEBOOK

THE GARDENER'S ASSISTANT

Have your IBM PC or PCjr layout your garden, and suggest plant/harvest dates and quantities to buy and plant. Select from over 50 vegetables or add your own. Garden layout is produced on your screen where you may use commands to modify the layout. Optional printer output. Garden(s) may be saved to disk. IBM PC and PCjr with one disk drive \$45.00. (Also available for Apple II series and C-64). SHANNON SOFTWARE, LTD P.O. Box 6126 Falls Church, VA 22046 (703) 573-9274

STAMP COLLECTORS

The Philatelic Management System is superior software for every level of collector. Covers every aspect of collection management. Inventory Module now available and upgradeable to complete system. IBM PC, Apple IIe and III. Complete system, \$295, Inventory Module \$159. Demo package \$15, credited to final purchase. SOFTSTYLE, INC. 7192 Kalaniana'ole Hwy., Suite 205 Honolulu, HI 96825 (1808) 367-5600

SOFTWARE INFORMATION MANAGEMENT

KWIC-REF/1

A general purpose text filing system. It is designed to file and cross reference documents, notes, letters and any text materials. It can keep track of up to 32,000 key words and 32,000 documents using "and" "or" and "xor" combinations. \$250.00. CHEN INFORMATION SYSTEMS, INC. 3150 Almaden Expressway Suite 243 San Jose, CA 95118 (408) 723-2343

SOFTWARE INSURANCE

THE AGENCY MANAGER™

Designed by insurance professionals for independent insurance agents, this integrated system performs: Customer acctg., general ledger, client data update and retrieval, over 100 marketing reports and sales tools, ACORD's. Easy main menu and HELP feature. IVANS. IBM-PC, CP/M, Turbodos. APPLIED SYSTEMS Pauling Rd. Monee, IL 60449 (312) 534-5575

SOFTWARE INTEGRATION

\$9—TOP QUALITY SOFTWARE

Word processor: Word wrap, full screen editor, ASCII, 255 char! Spreadsheet. Super fast. File Manager. Fast key access, double precision, dates, self-teach. Easy-to-use, reliable, & functional. Doc. included. \$25 for all 3. 128K PC or jr. Free trial. \$499 enhanced TCS accounting, \$198 best mail list, \$298 inventory, \$99 OE & PO. MICRO ARCHITECT, INC. 6 Great Pine Ave. Burlington, MA 01803 (617) 273-5658

SOFTWARE LANGUAGES

FORTH-32

The most complete language available for the PC. Comprehensive 420 page manual. Complete interface to DOS and BIOS, including graphics, video interface, parallel and serial ports, light pen, joy-stick, sound, color, DOS file access. Double screen editor. The only full FORTH 8088 Assembler. See our ad this issue. QUEST RESEARCH, INC. 303 Williams Ave. Huntsville, AL 35801 (800) 558-8088 or (205) 533-9405

COMPATIBLE LANGUAGES

C, Pascal and Multi-Basic compilers generate compatible object code so languages can be mixed. C is full K&R, Pascal is full Jensen & Wirth + extensions and Multi-Basic compiles both MBASIC and CBASIC. \$139 each. Available for PC DOS, MSDOS, CPM80; TRSDOS on Models I, II, III, 4, 12. Send for free brochures. ALCOR SYSTEMS 13534 Preston Rd., Suite 365 Dallas, Texas 75240 (214) 494-1316

BETTERBASIC

- STRUCTURED LANGUAGE WITH BASIC SYNTAX
- EXTENSIBLE—CREATE YOUR OWN KEYWORDS
- MODULAR-PROCEDURES CAN BE GROUPED TOGETHER INTO LIBRARY MODULES FOR HIGHER PRODUCTIVITY
- UTILIZES FULL PC MEMORY CAPACITY (640K)
- FULL SUPPORT FOR GRAPHICS, COMMUNICATIONS, AND SCREEN FORMATTING. \$199, 8087 MODULE \$99. RUNTIME SYSTEM \$250, SAMPLE \$10. SUMMIT SOFTWARE TECHNOLOGY, INC. P.O. BOX 99 BABSON PARK WELLESLEY, MA 02157 (617) 235-0729

PASCAL FOR THE PC:

EXAMPLES PLUS & PLUS TWO

Jato Inc. now offers diskettes with over 600K bytes of useful info about IBM Pascal 1 & 2 plus info on DOS 3.0. More than 120 sample programs. Save time and effort, we have found the problems and documented the solutions. Available for \$30 each or both for \$48. (CA add 6%) or \$3.00 (refund with order) for complete description. JATO INC. 24861 Alicia Parkway, Suite 272-B Laguna Hills, CA 92653

SOFTWARE MANUFACTURING

MCBA MANUFACTURING SYSTEM

Adapted for the IBM PC using MS-DOS. Inventory Management, Bill of Materials, Order Processing, Purchasing, Job Costing, MRP, Labor Performance, Shop Floor Control, Standard Product, Costing and Routing, Accounting. Install & support available. In use at over 11,000 installations!!! MDM Systems, Inc. 24525 Southfield Rd. Suite 205 Southfield MI 48075 (313) 557-1254

MYTE MYKE™ MANUFACTURING

CONTROL SYSTEM integrates with BUSINESS SYST & features mainframe capabilities. STD COST ... bill of matl and operations routing provide where used, same as except, & projection capabilities. FORECAST/SCHED, MRP, MPP, Production costing, SHOP FLOOR CTRL. Install & support avail CP/M, PC DOS, MS DOS, UNIX & more.



MDS ASSOCIATES, INC. P.O. Box 108 Orchard Park, NY 14127 (716) 662-6621

STRUCTURAL FABRICATORS

PC/Cutlist takes input from your bill of material. Detail drawing and calculates the best cutting combination for any length stock and prints a shop ready cutting list and scrap report. Also an optimization feature finds best mult length for mill orders. Price \$300.00. Demo Disk \$25.00. THE JOSEPH ALBERT CO. P.O. Box 611 Blue Island, Illinois 60406 (312) 349-9032

MFB. CONTROL SYSTEMS

A Comprehensive system for repetitive or job shop type manufacturers consisting of: B/M, Inventory, Order Processing, Purchasing, Mat. Req. Planning MRP, MPS, Shop Floor Ctrl & CRP, Cost devel., Job & W/O Costing, Accounting. 1 Yr. warranty included. Train & consult avail. Compare our system & prices for best value. PRODUCTION SYSTEMS INC. 410 Macklyn Ave. Santa Rosa, CA 95405 (707) 526-1294

HELMSMAN'S H-MRP SYSTEM

Mature and classic, on-line net change. MATERIAL REQUIREMENTS PLANNING Module, fast, simple, easy, flexible, and cost effective. Integrates with accounting. Runs on PC-DOS 512K, hard disk, standalone or networked. Includes H-BOMM, H-BUY, H-STORE, H-MAKE, H-PLAN. HELMSMAN SYSTEMS, INC. 1030 So. Winchester #205 San Jose, CA 95128 (408) 246-8300

SOFTWARE MEDICAL

POS/1™ VERSION 4.0

MEDICAL BILLING & A/R. Statements & Ins. forms. Aging & revenue analysis with bar graphs. Multiple doctors, practices, insurances. Day sheets, recall notices, referring physicians, audit trails, ledger details. Online update & access by acct. #/name. Customizable procedure & Dx codes; menu-driven; help screens. PC-DOS, 128Kb, hard disk. \$2200. CHEN INFORMATION SYSTEMS, INC. 3150 Almaden Expressway Suite 243 San Jose, CA 95118 (408) 723-2343

CompuMedic™

PROVEN Medical Management System—in use 3 yrs. Patient data management, A/R, statements, insurance forms, practice analysis, word processing. Options—Split Aging By Doctor, Laboratory, Canadian, Industrial medicine, electronic claim processing. Training included. XT \$3600. Dealer inquiries invited. DATA STRATEGIES, INC. 332 S. Juniper St., Suite 210 Escondido, CA 92025 (619) 489-9218

THRESHOLD

120 programs for A/R, office management, clinical studies, referring physician reports, electronic claims submission. Includes: on-line help, full security with audit trails, patient name orientation, \$3,900. FREE REMOTE DEMONSTRATIONS AVAILABLE. Requires hard disk, 256K, DOS. PHYSICIANS PRACTICE MANAGEMENT, INC. 1810 South Lynhurst Drive, Suite Q Indianapolis, Indiana 46241 In the continental U.S. call (800) 428-3515 Indiana residents call (800) 792-3525

PC * CLAIM

Physician's office insurance claim filing with printed insurance forms & paperless claims processing. Overnight electronic claims submission. SPEEDS BLUE, M'CARE, PRIVATE INSURANCE SETTLEMENT. 23 programs, 3 diskettes, user manual. DOS/128K/modem/min. 2 floppy drives or h-disk. \$89.95—MONEY BACK GUARANTEE. PHYSICIANS PRACTICE MANAGEMENT, INC. 1810 South Lynhurst, Suite Q, Indianapolis, Indiana 46241 In the Continental U.S. call (800) 428-3515 Indiana residents call (800) 792-3525

BLUEBOOK

DRUG INTERACTIONS

Computer assistance with patient management. Enter up to 20 drugs by brand or generic name and get report of possible drug interactions. Over 500 drug names/3900 entries in memory. 128K Mono & printer needed. Extremely thorough: \$89 (From PA. add 6% tax). Send addressed stamped envelope for sample report.

Dr. Richard H. Jeffries
4600 Custer Drive
Harrisburg, PA. 17110

INCREASE DICTATION OUTPUT

Word processing for offices using dictation/transcription. MEDI-DICT PC™ is based on user defined problem templates. Save time and cut cost by dictating and transcribing only data unique to patients. Letters may be mixed with progress notes. \$120. Demo available. For PC-DOS, MS-DOS. Dealer inquiries welcome. PHYSICIAN MICRO SYSTEMS, INC.
801 E. Harrison St. Suite 105
Seattle, WA 98102
(206) 527-4010

DIFFERENTIAL DIAGNOSIS

The INTERNIST runs differential diagnoses on any combination of 480 symptoms for 331 diseases. Lists symptoms associated with any disease. Prints & displays diagnoses in rank order. Extremely easy to use and fast. Includes binder, user-manual, program & data base diskettes. \$95.00 VISA, MC/check or UPS COD accepted. N-Squared Computing
5318 Forest Ridge Rd.
Silverton, OR 97381
(503) 873-5906

SOFTWARE

MUSIC

TUNESMITH/PC™

Now you can make GOOD MUSIC on any IBM PC! It's easy with this amazing Music Development System—there's an ON-LINE TUTOR to guide you, plus a complete HELP screen. Simulated CHORDS allow you to create complex music. Special-purpose FULL-SCREEN music editor; 10 SAMPLE tunes to educate and entertain. Requires 96K, 1 drive, 80-column display. Introductory offer: \$49.95 (plus \$5 shipping).

TuneSmith/PC™



BLACKHAWK DATA CORPORATION
307 N. Michigan Ave.
Chicago, IL 60601
VISA MC/AMEX: (800) 328-5727 ext 131
in Minnesota: (800) 742-5685 ext 131

SOFTWARE

One-of-a-kind

COMPUTERIZED GREETING CARD

Unique programmable greeting card. You choose 1 of 9 tunes, 1 of 7 graphics-Xmas, New Years, Bday, Anniv., Wedding, Grad., Promotion. Personalize the card with your own message, your name, the receiver's name. Reusable. IBM & compatible with color graphics. \$29.95 (CA residents add 6%) allow 4-6 wks for delivery. GOLD MINE ENTERPRISES
PO BOX 481100
Los Angeles, CA 90048
MC/VISA (213) 273-5471

HOTEL 2000

A hotel management software package for the IBM-PC and compatible micro computers. Includes all hotel functions: Reservations, Front Desk, Housekeeping, Guest Accounting and Night Audit for the back office. It is a "USER-FRIENDLY" system which guides the user with menus and messages and requires no previous computer experience whatsoever. Demo kits are available from \$190.00 and individual modules from \$1,350. Dealer inquiries are welcome. MASHOV CORPORATION
47 Marchwood Road Suite 2-G
Exton, PA 19341
(215) 363-8864

SOFTWARE

OPERATING SYSTEMS

MULTIPLE USERS UNDER PC DOS

MultiLink turns PC-DOS into an efficient multi-user multi-tasking operating system. Additional users are supported by attaching inexpensive CRT terminals or modems to serial ports on the PC, and can run normal applications designed for PC-DOS. Includes print spooling, keyboard enhancer, and communications software.



THE SOFTWARE LINK INCORPORATED
8601 Dunwoody Place Suite 336
Atlanta, GA 30338
(404) 998-0700

SOFTWARE

PREVENTIVE MAINTENANCE

MAINTENANCE & INSPECTION

An easy-to-use computerized method to organize, operate, and control an effective preventive maintenance system. Applicable to any type of business or industry. Full screen input and displays, plus function key help command. Maintains historical data, creates work orders, and provides numerous reports. Foreign language versions available. For information write to: PENGUIN COMPUTER CONSULTANTS
P.O. Box 20485
San Jose, CA 95160
(408) 997-7703

SOFTWARE

REAL ESTATE

REAL ESTATE TOOLS I

Over 45 powerful, easy-to-use, menu-driven analyses of mortgages (regular, balloon, GPM, constant principal, wrap), leases, construct. Loans and variable/grouped cash flows plus amortizations. Computes IRR, NPV, FMRR, price, points, yield, etc. For IBM PC/XT/compatibles, 128K, 2 DS drives. 228-page manual. \$299. ANSONN SOFTWARE INC.
2801 N. Surrey Drive
Carrollton, Texas 75006
(214) 446-4340

EZ-RE INVESTOR TEMPLATES

Complete analysis package for the Real Estate Investor. For Equity Share, Rent House, Apartments, Warehouses, and Office Buildings. Five mortgages can be ARM FHA245, amort, deferred int. or int only. Ten year projection of cash flow, deductions, sell price, tax at sell, gain or loss per year, and after tax IRR. Expenses, int, rent, and appreciation adjust annually. Also 45 year loan amortization template. Prof report. Requires LOTUS 123 and 256K. \$50 PPD. Money back guarantee. Visa, MC. LB ASSOCIATES, INC.
8817 Skokie Lane
Vienna, VA 22180
(703) 938-9093

SOFTWARE

SCIENTIFIC

MATRIX 100

Powerful Matrix operations with single statements in IBM PC BASIC. Perform multiple regression, solve simultaneous equations, invert matrices, etc. MATRIX 100 commands are fast, reliable and easy to use. Requires 128K. Price \$90.00 (\$4 shipping & handling, CA residents add 6.5% tax.) STANFORD BUSINESS SOFTWARE, INC.
4151 Middlefield Rd., Suite 215
Palo Alto, CA 94303
(415) 424-9499

SearchLH

Version 2.1 stores & searches bibliographic data. Retrieval based on key word index, title, author, source or abstract. Absolutely no programming required. Mainframe downloading. Multi-user data entry. Publication-quality bibliographies. Sorted output. Any DOS. AT-compatible. \$249.50. Send \$10 for demo disk. MEDISOFT.
1595 Soquel Dr. #350
Santa Cruz, CA 95065
(408) 476-7106

SOFTWARE

SERVICES

TAPE TO DISK CONVERSION

Convert any 9 track magnetic tape to or from over 200 formats including 3 1/2", 5 1/4", 8" disk formats and word processors. Formats available include IBM-PC, APPLE, Altos, TRS80 8" CP/M, Displaywr., IBM SYS/??, Macintosh, Wang, LANIER, OS/6 and 200 more. Disk to disk conversions also avail. Call for more info. PIVAR COMPUTING SERVICES, INC.
47 W. Dundee Rd.
Wheeling, Illinois 60090
(312) 459-6010

SOFTWARE

SECURITY

BIT-LOCK® SECURITY

Guard your valuable software from PIRACY. Our inexpensive security system protects you from lost profits. Copies will only operate with a BIT-LOCK device attached. BIT-LOCK's powerful multi-layered security has proven its effectiveness on IBM PC/XT, TRS-80, Apple and commodore computers thru the test of time. MICROCOMPUTER APPLICATIONS
7805 So. Winderemere Circle
Littleton, CO 80120
(303) 922-6410

SOFTWARE SORT

OPT-TECH SORT/MERGE

Extremely fast Sort/Merge program for the IBM-PC. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts dBASE II files! Compare before you buy any other. Write or call for more info. \$99.

OPT-TECH DATA PROCESSING

P.O. Box 2167
Humble, TX 77347
(713) 454-7428

INTERNAL SORT FOR BASIC

NSORT—A FAST & easy to use quicksort subroutine written in C & assembler, CALLable from BASIC. Sorts an unlimited number of records in memory on up to 8 keys of mixed type, ascending/descending. Like having a SORT built into the language. Works w/compatibles. Compiled & Interpreted, all DOS versions. \$49.95+\$2.50 s&h MC/VISA/CHECK PA. +6% tax.

NATIONAL SOFTWAREWORKS

65 East Elizabeth Avenue
Bethlehem, PA 18018
(215) 867-4800

SOFTWARE STATISTICS

SIGSTAT

SIGSTAT includes over 30 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for uni—(e.g., ANOVA, regression) + multivariate (e.g., canonical, factor) analyses, time-series, multidim scaling, crosstab, plots, and much more. 8087 support opt. 256K, DOS, \$595.

SIGNIFICANT STATISTICS

3336 N. Canyon Road
Provo, UT 84604
(801) 377-4860

NWA STATPAK

Powerful data manipulation utilities, ASCII data structure for interface to databases, word processors, etc. Statistical functions include probability, descriptive statistics, regression and correlation, non-parametrics, distribution functions, means testing, survey data analysis, & ANOVA \$495.

NORTHWEST ANALYTICAL, INC.

520 NW Davis St.
Portland, OR 97209
(503) 224-7727

CRISP

CRunch Interactive Statistical Package offers a comprehensive set of statistical procedures and data management facilities. Very easy to use. Call us, if we can't help you, we'll tell you, and maybe be able to suggest some alternatives. \$495.

CRUNCH SOFTWARE

2547-22nd Avenue
San Francisco, CA 94116
(415) 564-7337

ELF-THE STATISTICAL PROG.

Reads & writes Visi-Calc, SuperCalc, Multiplan, dBase II, etc. Does Factor Analysis, Principal Components, Discriminant Analysis, Stepwise Regression, ANOVA (1 & 2 way), correlations, probabilities, t-Test, crosstabs, Frequencies, Transformations, permanent Database, and more. MC/VISA.

THE WINCHENDON GROUP INC.

P.O. Box 10339
Alexandria, VA 22310
(703) 960-2587

MATRIX LANGUAGE

GAUSS is a HIGH PERFORMANCE, FULL-FEATURED matrix programming language for IBM PC. Uses the 8087. EXTREMELY FAST—10 to 15x faster than IBM APL. STATE-OF-THE-ART numerical routines. EASY TO LEARN—uses standard mathematical syntax. INTRODUCTORY PRICE—\$250, with 30 day money-back guarantee.

Applied Technical Systems

P.O. Box 6487
Kent, WA 98064
(206) 631-6679

THE SURVEY SYSTEM

An easy to use, menu driven system for the entry, editing, processing and presentation of questionnaire data. The system can produce crosstabs and scores in banner format, statistics and bar charts. Tables and charts are camera-ready for professional presentations. Card readers and open-end coding/analysis options available.

CREATIVE RESEARCH SYSTEMS

1649 Del Oro Dept. P
Petaluma, CA 94952
(707) 765-1001

SOFTWARE STOCK ANALYSIS

FIVE FORMAT WAVE

A powerful stock market timing system. New technical Analysis technique exploits the most accurate timing indicators. Updates quickly and easily. Generates long term Buy and Sell signals with amazing accuracy. Hardcopy reports. Registered with the Securities and Exchange Commission. For IBM PC, XT, jr and compatibles. \$129 check, VISA/MC. Send for free details.

FINAL ANALYSIS

P.O. Box 3631-A
Langley Park, MD 20787
(301) 445-1371

WINNING ON WALL STREET

Fast, easy, sophisticated system for making money in the market. TRADER'S DATA MANAGER, data base for all securities. Auto download. TRADER'S FORECASTER, technical analysis. Charting. TRADER'S ACCOUNTANT, 10 Reports. Simulations. WINNING ON WALL STREET—THE COMPLETE SYSTEM, integrates all three. \$15 DEMO.

SUMMA SOFTWARE

P.O. Box 2046
Beaverton, OR 97075
In OR, (503) 644-3212; (800) 792-2211

SOFTWARE TAXES

TAX PLANNING TEMPLATE

A diskette to be used with 1-2-3, or Symphony. User can toggle between 1983 & 1984 computations, incl. both years' tax tables. Computes state income taxes. 256K req. Flexible, menu-driven. Follows IRS forms by line number & incl.: 1040 Sch. A, B, C, D, E, G, W, SE, forms 2119, 2441, 3468, 6251. \$75.

PERSONAL TAX PLAN™—PERMAR & ASSOC.

1125 Sunnyside Road—Dept. PCM
Oakland, Ca 94610
(800) 443-0100 X644

TURBOTAX™

Full feature Fed. income tax preparation & planning software. 33 forms, schedules, & worksheets. FAST! Calculates fully cross-referenced return under 3 seconds. WINDOWS! Operates like a spreadsheet. Exceeds IRS print specs. Full depreciation support. Much more! CA/AZ modules avail Dec. FREE update in Jan. Req 192K. \$65. VISA/MC. (CA res. 6½% tax) + \$5 S&H

ChipSoft, Inc.

5674 Honors
San Diego, CA 92122
(800) 621-0852 Ext 355

PROTECT YOUR TAX DEDUCTION

AutoLOG—an automatic computer time log required under '84 Tax Act. Record all usage of your computer. You define the categories and AutoLOG takes care of all the rest. Only \$49.95. Call or write:

MicroClear Inc.
342 Madison Avenue
New York, NY 10017
(212) 867-0481

TAX PREPARATION

1984 Federal tax program follows IRS forms and includes form 1040, sch. A-G, R, RP, SE & W and forms 2106, 2119, 2441, 3468, 3903, 4562, 4797, 4835, 4952, 4972, 5695 and 6251. Available for the IBM PC, PCjr, TI Pro, and DEC Rainbow with MS-DOS. Requires 128K. Price: \$99; updates \$29 Check/MC/Visa.

DUNPHY SYSTEMS INC.

2215 Deewood Drive
Columbus, Ohio 43229
(614) 891-2131

IBM/PC 1-2-3 TAX TEMPLATE

1984 1-2-3 Tax Template. Easy-to-use. Runs on 256K. Two options: First includes: Form 1040, SCH A-E, G, R&RP, SE, W, Forms 2106, 2441, 3468, 4562, 5695. \$18.00. Second incl above plus SCH F, Forms 2119, 3903, 4136, 4684, 4835, 4952, 4972. \$23.00. Immediate Delivery. Money-back if returned within two weeks.

SIRON-TAX

13445 SW CRESMER DRIVE
Tigard, Or 97223
(503) 655-2743

TAXTIME™ for Lotus 1-2-3™ (formerly Tax 4-5-6)

• 1040-REG 256K \$35
1040 A, B, C, D, G, SE (2), W, 6251, + IRA, ETC.

• 1040-PRO 320K \$95
Above forms + C, E, F, R, 2106, 2210, 2441, 3468, 3903, 4562, 4797, 4952 & 5695. Automatic support statements. Multi C, F, & 4562. All forms can be sent to IRS.

• CALIF-540 256K \$95
State forms 540, 540NR, A, B, CEF, D-1, G, H, P, R, 3514, 3805L, N, U, X, 3885, & 5805. Can be merged with 1040 if 512 K memory.

• NY-201/203 256K \$95
New York forms IT-201, 201ATT, plus non-res 203, 203ATT, NYC 203, 112R, 220, 250, 360.

• CORP-1120 320K \$195
1120, 1120S, C, D, W, 2220, 3468, 4255, 4562, 4626, 4684, 4797, K-1. Two programs in one package. Available in March 1985.

• PARTNER-1065 256K+ \$195
1065, D, F, K, K-1s, 4684, 4797. Stores indiv. data for each partner & prints K-1s. Can add State info. Available February 1985.

GENERAL INFORMATION

All forms look like the real ones & are highly integrated for minimum entry duplication. Change one entry & all others are updated in 10 secs. Most are IRS/State appvd. Good for tax planning since tax totals are always shown on bottom screen window. Extensive use of menus & macros = easy input & output. Requires LOTUS 123/1A (tm-Lotus Develop Co.) and memory listed. Annual updates \$45-\$75.

TAXTIME™ by Austin Scientific, Inc.

1259 El Camino, Suite 260B
Menlo Park, CA 94025
USA (800) 227-2634 x 998
CALIF (800) 772-2666 x 998

TAX CALCULATION WORKSHEET

OWN OR USE LOTUS 1-2-3 or MULTIPLAN? Then use their power to calculate YOUR taxes. We have spreadsheets that compute personal 1984 taxes using ALL possible methods allowing a choice of the most favorable. Includes 1040/A, Sch A,B,D,G,RRP,W,2106,2110,2440,2441, 3903 and 5695. All for \$29.95. With C,E,SE, 3468, 4562-\$39.95

ComSys Inc.

66 Blackberry Road
N Attleboro, MA 02760
(617) 695-1967

INFO-TAX 84

Tax preparation & planner. East IRS facsimile input screens. Instantaneous Assembler I/O. Automatically computes totals and calculates tax. Print IRS approved forms or to IRS pre-printed forms. Individual (\$95), Preparer's (\$225). Preparer's generates cover letter and labels. Try our Demo (\$10).

COMPUTER REALTY SYSTEM, INC.

5712 Magic Mountain Drive
Rockville, Maryland 20852
(301) 468-1055

BLUEBOOK

TAX PREPARATION TEMPLATE

1984 Federal tax template for use with Lotus 1-2-3. Follows IRS forms & schedules. Readily understandable WRITTEN DOCUMENTATION, prepared by former IRS ATTORNEY-CPA, explains template; includes tax checklists of income & deduction items; examines frequently asked questions and tax issues relating to specific line items. \$99. Visa/MC/Chk.
1-2-3 TAX MISER
PO Box 620835
Littleton, CO 80162
(303) 972-0539

1984 TAX YEAR TEMPLATES

3rd year! Our only product! Personal Service! Templates for individual income tax return prep. on your spreadsheet. 9 Forms, 9 Sched.; Worksheets, avail. for 1-2-3, Perfect Calc, MultiPlan, Super Calc & SC2/3, VisiCalc IV/AV. Supporting Forms & Schedules print IRS approved substitute forms. \$45.00. Annual update \$25.00.
APPLICATION ENGINEERING
2238 Grey Fox Court
Orange Park, Florida 32073
(904) 264-4619

SOFTWARE TERMINAL EMULATION

BURROUGHS HANDSHAKE

AN ALL-SOFTWARE Burroughs MT9 83/TD 830 terminal emulator. HANDSHAKE allows PC or compatible microcomputer to communicate with existing Burroughs host programs. Also transfers files between the host and microcomputer disk storage concurrent with dialogue. Installed worldwide
SOFTWARE CLEARING HOUSE
771 Neeb Road
Cincinnati, OH 45238
(513) 451-6742 Telex 24-1665

BLUE LYNX

Replace your dumb terminals with smart PCs and XT's. TECHLAND SYSTEMS is the nation's leading synchronous communications company with over 6,000 BLUELYNX* installed. The BLUELYNX hardware/software product emulates the 5251/12 for the S/34, S/36 and S/38. Now bundled with AutoLynx for unattended operation... only \$745. BLUELYNX 3276 for the larger 43xx and 30xx mainframes, both SDC and BSC versions, now comes bundled with Data Reader, a utility that facilitates the formatting of host files into Lotus 1-2-3, dBASE, etc... only \$795. Printer and up-and download support available with both versions.



**TECHLAND
SYSTEMS INC.**

TECHLAND SYSTEMS, INC.
25 Waterside Plaza
New York, NY 10010
(212) 684-7788

VT100 on PC, jr, XT, AT

ZSTEMpc-VT100 Smart Terminal Emulator
132 columns by windowing—no addit. hardware Double High/Double Wide Characters Complete VT100 line graphics & Smooth scroll Full keyboard softkeys/MACROS
Bidirectional file transfers including XMODEM
Speeds to 38.4KB. High throughput. \$150.00 quantity. Dealer discounts available. 30 day money back guarantee. MC/Visa accepted.
KEA SYSTEMS LTD.
#412-2150 W. Broadway
Vancouver BC, Canada V6K 4L9
Support (604) 732-7411—Orders (800) 663-8702

SOFTWARE TRAINING

THE AUTHOR* & AUTHOR PLUS

THE AUTHOR* is a flexible, reliable, COMPUTER AUTHORING SYSTEM. Its ease of use, automatic branching, complete record keeping & thorough documentation make it a proven winner. THE AUTHOR PLUS* combines all of these features with GRAPHICS, expanded use of function keys, and full screen editing & entry.
RAPTOR SYSTEMS, INC.
324 South Main Street
Stillwater, MN 55082
(612) 430-2980

ATHENA COMPUTER WISDOM

Athena Software Training activates your IBM-PC to capacity. Progressive Video tapes and interactive guide books facilitate personal learning on programs such as R-Base 4000, The Word, State of the Art General Ledger and Symphony. Athena delivers a convenient, affordable and simple solution to software understanding. Accept the wisdom of Athena. Available in VHS, Beta or 1/4".
VIDEO LOGIC
15830 S.E. 114th
Clackamas, OR 97015
COLLECT (503) 657-7942

SOFTWARE TYPESETTING

HIGH-TECH TYPESETTING

Transmit your text via toll-free lines directly to our fully automated typesetting system. \$2. per K characters with a \$5. minimum. Same day service. 200 typefaces in sizes up to 72 point. Send \$15. + \$3. shipping for our 220 page guidebook, or call toll free and use your MC, VISA or AMEX.
INTEGRAPHICS INC.
106A South Columbus Street
Alexandria, VA 22314
(800) 368-3342 or (703) 683-9414 in DC area

TYPESETTER II™

Tired of standard printer type? TYPESETTER II produces high quality typeset forms on your Dot Matrix printer with 25 unique fonts and sizes. Give everything you print more impact with the most comprehensive typesetting system available for the IBM-PC. Price: \$59.95 checks/MC/Visa/COD. Extra fontpacks: \$19.95.
DATA ARTS SOFTWARE
Box 1613
Troy, NY 12181-1613
(518) 273-3053

SOFTWARE UTILITIES

SYMBOLIC DEBUGGING

The Mylstar SD Program enhances IBM DEBUG Program using the same command structure. Use symbol names, mathematical expressions, Batch Files, on-line help, multi-command macros, and loop structures. Makes your job easier, for PC-DOS 1.1, 2.0, 2.1 128K RAM minimum. \$125.00 check, money order, MC or VISA.
MYLSTAR ELECTRONICS, INC.
165 West Lake Street Dept. 120
North Lake, IL 60164
(312) 562-7400

COPY PROTECTION BY MSD

The ULTIMATE diskette copy protection system designed for software developers and publishers. A variety of protection methods are available to suit your protection requirements. All IBM PC and XT environments are supported which includes DOS, BASIC (compiled and interpreted) Pascal, P-System, dBASE II and stand-alone systems. Customized systems also available. Requires 64K, two disk drives.



MICRO-SOFTWARE DEVELOPERS, INC.
214 1/2 West Main Street
St. Charles, Illinois 60174
(312) 377-5151

SCREEN DESIGN MADE EASY!!

Screen Generator and Processor for BASIC programmers. This package combines a Screen Painter for creating and modifying screens and Macro Language and Compiler for quicker coding and testing. Features COLOR, field variables, complete input editing, line drawing. For BASIC, BASICA, and BASIC Compiler users. Includes manual and reference card. \$99.95 VISA/MC accepted.

BasicWindow™

G. FREEMAN & COMPANY, INC.
15 Albin Road
Stamford, CT 06902
(203) 327-9868

PADLOCK/PADLOCK II DISKS

PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands \$99. PADLOCK II disks come preformatted with finger-print and serialization. PADLOCK II disks offer superior protection. Ask about our fast data encryption product. All work with hard disk, EXE/COM files and all DOS versions. MC/VISA.
GLENCO ENGINEERING
3920 Ridge Ave.
Arlington Hts., IL 60004
(312) 392-2492

SCREEN MANAGEMENT SYSTEM

SMS is simply the best utility available for designing, using, and saving color/monochrome screens. GOSUB's are supplied in BASIC to input, output, and edit screen data fields. Loads of extra features. We have been in business 15 years, winning many awards for programming excellence. Price \$195, demo \$50. Manual \$10.
VISA/MC PC/XT/PC jr /64K/1 Disk.
DNA SYSTEMS, INC.
P.O. Box 1424
Saginaw, MI 48605
(517) 793-0185

BACKUP RESTORE

Backup database or other files from a Winchester to a floppy under concurrent CP/M and/or CP/M 86. • Automatic volume management • Selective file backup/restore • Database backup/restore • Compression reduces space required to store data. Requires IBM PC/XT or clone with 128K RAM, one diskette drive and Winchester disk. To order use MC/VISA or send \$99 to:



AWARD SOFTWARE INC.
236 North Santa Cruz Ave.
Los Gatos, CA 95030

(408) 395-2773

COPY II PC

COPY II PC backs up protected & unprotected software, with verification. Available memory is fully utilized to minimize disk duplication time. Also includes a drive speed utility that can pinpoint drive problems. For IBM-PC, \$39.95 + \$3 s/h (\$8 outside North America). Prepayment required. VISA/MC, check or money order.
CENTRAL POINT SOFTWARE, INC.
9700 SW Capitol HWY #1008
Portland, Oregon 97219
(503) 244-5782

FULL CONTROL FROM BASIC

Cut development time, add speed & power to your programs w/NLIB. A library of assembly language sub-routines callable from BASIC: execute COM & EXE files, save & restore areas of the screen, clear & scroll windows, much more! Add DOS functions to your menus. Create fast help screens. Unlimited uses. All DOS versions. \$49.95. + \$2.50 s/h MC/VISA/CHECK. PA + 6% tax
NATIONAL SOFTWARES
65 East Elizabeth Ave
Bethlehem, PA 18018
(215) 867-4800

BLUEBOOK

Hard Disk DIRECT ACCESS™

The ULTIMATE utility for any hard disk user. DIRECT ACCESS is a powerful hard disk management tool. Organizes your software programs into a "user defined" menu system. Features attractive screen display, rapid access into an application using a single keystroke & easy to learn. Also handles batch files & complicated DOS commands. Order today. Only \$59.95 + \$2.50 shipping. MC/VISA.



DELTA TECHNOLOGY

DELTA TECHNOLOGY
PO Box 1104
Eau Claire, WI 54702
(715) 832-0958

DOS PATH Command for Data

Now Lotus 1-2-3, dBASE II, WordStar and most others can access data files no matter where they are located! Works with hard disks and floppies. DPATH is a system stay-resident function that allows you to organize your disk any way you like. Includes a screen-oriented maintenance utility & a 60-page manual. DOS 2.0/compat. \$25. + \$2 shipping & handling. PERSONAL BUSINESS SOLUTIONS INC. PO. Box 757 Frederick, MD 21701 (301) 865-3376

PERSONAL COPIER™

Personal Copier copies EVERYTHING! and, our monthly trade-in offer GUARANTEES that you're up to date with new and ever changing protection methods. Fully automatic with easy-to-use two-step graphic screen instructions ... anyone can use it. Every IBM PC user should have one. \$39.95 + \$3 s/h. M/C, VISA.

personal
Copier

DISK-TECH
P.O. Box 162
Wasco, IL 60183
(312) 365-2803

DIR-X: DiRectory eXtended

Works like the DOS "DIR" command but does more: SEARCHES/LISTS directories for file-names containing ANY CHARACTER STRING you specify. Searches all sub-directories on a hard disk. Great for hard disk maintenance and house-keeping! PREDICTS how much space your files will occupy on floppy disks. For DOS 2.0 or greater. \$35.00. 30 Day money-back Guarantee. MC/VISA/Check accepted. PANTHER ASSOCIATES Rt. 1, 1014 Cimarron Circle Roanoke, Texas 76262 (817) 379-5266

CopyWrite

CopyWrite backs up IBM PC software. We have not found anything that we can't copy. CopyWrite is revised monthly to keep up with the latest in copy protection, and comes with a trade-in offer. It needs an IBM PC, 128K and one disk drive, but can use more memory or another drive. \$50 US. Check/Credit Cards. U.S. Inquiries. QUAID SOFTWARE LIMITED 45 Charles St. East 6th Flr. Toronto, Ontario Canada M4Y 1S2

SYMD: SYMBOLIC DEBUGGER

SYMD simplifies debugging by utilizing source symbols and line numbers. SYMD also lets you: Display test program output on separate Flip-screen: Examine/change real numbers; Assign permanent breakpoints; Backtrace instruction sequences; Profile your program to find hot spots. And much more. Priced at only \$125. D+V SYSTEMS 400 Amherst St. Nashua, NH 03063 (603) 881-7140

MATIS, A NEW GENERATION

70 assembler sub-routines used as BASIC commands, also callable from C and PASCAL. Features: window display, data scrolling, easy drawing commands, total control of video attributes, screen loading and saving to disk, printer utility, demo program. 170 page manual. \$150. \$2.50 shipping. CA res. add 6.5% tax. VISA/MC. SOFTWAY INC. 500 Sutter St., Suite 222 San Francisco, CA 94102 (415) 397-4666

IBM USES CPM DISKS!!

Uniform lets you run CPM disks in your IBM 8: drive while running any DOS 2.0 program. Read and write to the CPM disk directly or convert files to IBM format. Over 70 formats, also 8" and 96 TPI IBM PC, XT, AT. Call for details. Next day shipping. Dealers Invited. \$64.95 + \$5 S&H. Uniform by Micro Solutions. BLUE HERON PUBLISHING CO. 8350 Lincoln Avenue Skokie, Illinois 60077 (312) 676-1080

OH-WINDOWS FOR C

Powerful window function library as easy to use as printf. Color, B&W, mono. Sixty-five windows on four pages. Overlay, disk save/restore, print, titles, borders, line or page scrolling. Detailed manual with applications. Minimum system overhead. MS C, Lattice C, C86. \$74.95. Demo \$5. PC/XT. MC/VISA. CAB Concepts 125 Main Street, suite F Bay St. Louis, MS 39520 800 824-3609

DOCUMENT COMPUTER USAGE

PC-LOG—Provides record-keeping system for computer usage. Meets IRS requirements for computer log documentation beginning in 1985. Records date, time, and task description for each computer session. Menu-driven utility program provides a user-selected summary of computer usage. \$39.00. PC-SEA INC. 2728 Orenda Drive Union Lake, MI 48085 (313) 360-1026

DIGICON PRINT PACKAGE

Want SIDEWAYS printing for SPREADSHEETS? How about BANNER, PAMPHLET, LETTER, and BOOKLET printing too? Variety of fonts. Graphics characters. Character editor to MAKE YOUR OWN FONTS or SYMBOLS! Quick printer setup program too. Easy menus, online help. IBM/Epson printers. DOS, 128K. \$49.95 (PA + 6%) DIGITAL CONCEPTS, INC. POB 8345, Dept A Pittsburgh, PA 15218 (412) 823-8314

INTRODUCING TIME TRACKER

TIME TRACKER automatically keeps track of computer usage and prepares detailed reports. This is a must for income tax records, billing, justifying additional computers, and monitoring computer usage. Utilizes windows and function keys. To get the most out of your computer you need TIME TRACKER. Visa/MC/Check/COD. \$21.95 + S/H KD Ware, Dept 30 POB 712 DeKalb, IL 60115 (815) 756-6286

NEW! BASIC UTILITIES

Compile Trace Compare

AUTOCPL Precompiler. Fast compile. Saves disk space. Removes line numbers. Requires 256K AUTOTRC Single step or continuous trace in COMPILED or BASIC. Break on variables/lines AUTOREM Removes and restores REMarks. Prints program w/REMARKS down right side of listing AUTOCOMP Fast compare of program differences \$49.95 each (includes RAMDISK and SPOOLER) any 3 for \$99.95; all 4 for \$129.95; s/h \$2.50 each. TIMESHARE ASSOCIATES, INC. 10202 Robinson Overland Park, KS 66212 (913) 642-7564

NO LIMIT

Now FORTRAN and Pascal users can fully realize microcomputing advantages. Add powerful Assembler subroutines to MS FORTRAN and Pascal. Extensive graphics, full screen access, input during execution, file mgmt., port control, PEEK & POKE. \$89.00 V/MC accepted. MEF ENVIRONMENTAL INC. PO Box 26537 Austin, TX 78755 (512) 251-5543

WORDFIX

Convert WordStar files to standard ASCII text. Wordfix is easy to use & fast. No programming required. You can unhyphenate, unjustify, remove Ctrl Chars & dot command, and convert printer commands. Supports PC-DOS path and wildcard file names. WKS w/LAN file servers. For PC-DOS 1.1 thru 3.1. \$49. VISA/MC/AMEX. MicroDevelcomm, Inc. 8285 SW Nimbus, Suite 130 Beaverton, Oregon 97005 (503) 641-7072

SOFTWARE

WORD PROCESSING

MULTIMATE™

Multimate™ is a function key oriented, menu-driven word processor comparable to larger dedicated systems. The system offers over 100 WP functions and utilities including an 80,000 word speller/dictionary, merge, boiler plate call-back and the most advanced printing and sheetfeeder capabilities. An on-line help-facility, complete users manual and adhesive color coded key tabs are provided to facilitate minimal training time. A truly user friendly system. SOFTWORD SYSTEMS, INC. 52 Oakland Ave., North E. Hartford, CT 06108 (800) 243-4646

WordPerfect

A powerful word processing package which comes with special features such as a spelling dictionary, math, text columns, footnotes, headers/footers, and macros. Proportional spacing and special characters such as Greek, math and foreign symbols are supported. Easy to learn and use. \$495. SATELLITE SOFTWARE INTERNATIONAL 288 West Center Street Orem, UT 84057 (801) 224-8554

LASER TYPE

Laser Type is an intelligent text formatter capable of generating table of contents, preface, index, line tables for term papers, software & technical manuals, & books. Laser Type is highly command oriented with sophisticated commands including keep areas, font selection boxed text, chapter, section, subsection. \$395. SOFTLAB, INC. PO. Box 879 St. George, UT 84770 (801) 628-4969

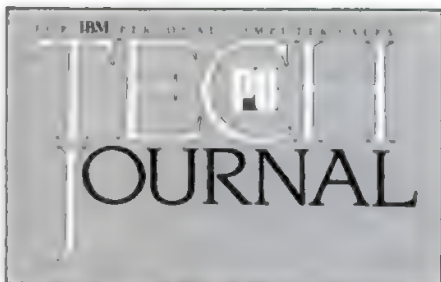
PC-WRITE™

Features: wordwrap, search/replace, justify, block move/copy/delete, headers/footers, etc. Help screen, quick ref card, 100 page manual. Split screen, edit two files at once. Disk with software and manual \$10; registration with support, source, and commissions \$75. Shareware: can copy and share with others. Visa/MC. QUICKSOFT 219 First North #224c Seattle, WA 98109 (206) 282-0452

MY WORD! IS JUST \$25!

MY WORD! is a WS-like word processor for the IBM PC/XT/JR or compatible (even Tandy 2000) Sort, mail merge, quick print; use 256 char.! Word wrap, 100+ operations, won't lose text, ASCII files. Manual with index included. Full source code: just \$25 more! New! My Word! Extended ver. Includes customization program, built-in calculator, utilities, more, for \$35; source \$35. 96K, 1 drive, DOS 1.1, 2.0, 2.1, 3.0 30-day money-back guarantee! T N T. SOFTWARE, INC. 34069 Hainesville Road Round Lake, IL 60073 (312) 223-0832

COMING UP



A Member of the Ziff-Davis
of IBM PC Magazines

B-Tree Structure

Data management packages of many descriptions call themselves B-tree based, and some are—but others aren't. A *Tech Journal* tutorial on B-trees, how they are built, and the advantages and disadvantages of using them begins in the first article in a two-part series on understanding this important tool for building data management packages.

Turbo Pascal

With the advent of Borland's popular Turbo Pascal comes the need for ways to use this powerful tool. *Tech Journal* delves into the subject of extending the power of Turbo Pascal to other programs. Pascal coverage in February also includes a review of another new product from Borland, the Turbo Toolbox, and a how-to piece on accessing the command processor's set environment from IBM Pascal.

Memory Options for PCjr

Tech Journal looks at three sidecars that increase Junior's memory with hardware reviews of PC Captain and PC Wave from Tecmar and the IBM Memory Expansion Sidecar.

Communications

Continuing its survey of communications products for the PC, *Tech Journal* presents an in-depth review of Janadon's Hostcomm, a product that allows messages to flow from PC to PC through remote access.

CopyWrite backs up IBM PC Software

Hundreds of the most popular copy-protected programs are copied readily. **CopyWrite** needs no complicated parameters.

Requirements: IBM Personal Computer or XT.
128k bytes of memory.
one diskette drive.

CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly, to keep up with the latest in copy protection. You may get a new edition at any time for a \$15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order **CopyWrite**, call with your credit card or mail a check for \$50 US funds to:

Quaid Software Limited

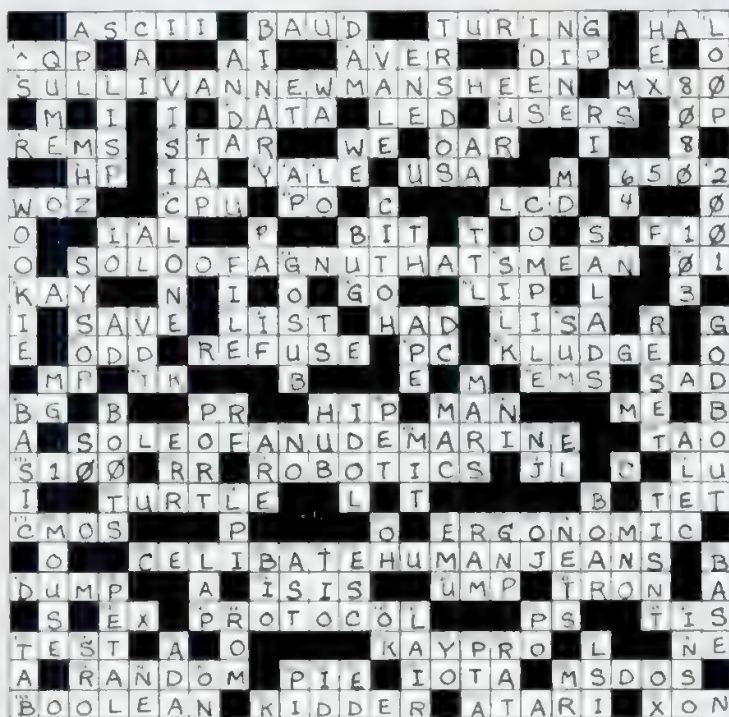
45 Charles Street East, Sixth Floor
Toronto, Ontario, Canada M4Y 1S2

Telephone (416) 961-8243

Ask about **ZeroDisk** to run copy-protected software from a hard disk

CROSSWORD PUZZLE SOLUTION

(See "A Microcomputer Crossword," page 226.)



PC: Mart



714/898-0336

MANUFACTURING

PROM BURNER

2716
2732
2764
27128



\$249.00

Complete MS-DOS, PC-DOS Software Package allows reading, storing to disk, recalling, and burning! Also may read INTEL hex format file or CMD output from assembler

- On-board voltage generator
- Optional extension cable and "Gang Burner"
- High-speed algorithms burns 2764 in **45 seconds!!**
- No interference with normal computer operations

5791 Machine Drive Huntington Beach, CA 92649

BASF
FlexyDisks®



5 1/4"

Specify soft,
10 or 16 sector

Minimum Order 20

Single side
double density **1.35 ea**

Double side
double density **1.65 ea**

Hard sectors in Library box only add .15.

Certified Check - Money Order - Personal Check. Allow up to 2 weeks for personal checks to clear. Add \$3.00 per 100 or part to each order for U.S. shipping charges. NJ Residents add 6% sales tax.

DATA
EXCHANGE INC.

178 Route 206 South, P.O. Box 993
Department C
Somerville, N.J. 08876 • (201) 874-5050

CIRCLE 54 ON READER SERVICE CARD

COMPUTER T-SHIRTS

FOR HOME, SCHOOL,
AND OFFICE!



The **ULTIMATE** Software
MUST for all computer lovers!
BRIGHT GREEN, C.D. LETTERS
CUSTOM BLUESCREENED ON 50/50 BLEND

— HIGH TECH DESIGN! —

Five popular styles to choose from

Order Today! Only \$8.95 pdd

Made in U.S.A. Simply select Style and Color below

LET'S SEEK PEAK & POKE! #1 White #2 Pink #3 Blue #4
TAKE A BYTE OUT OF ME! #5 Green #6 Gray #7 Red #8
I'M USER FRIENDLY! #9 Black #10
HAPPINESS IS A PROGRAM THAT WORKS! #11
♥ COMPUTERS! #12 CUT SIZES S M L XL

Please send me _____
Style _____ Color _____ Size _____
Use additional sheet if necessary

COMPUTER NOVELTY CORP.
P.O. BOX 2964
FREEPORT TEXAS 77541
Enclose \$8.95 pdd each 13 Day 5% tax

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

©CNC

We Help Bring Your Family Together

6 Types of Charts and Sheets
Indices

User Fields

Notes, Footnotes and Sources
No Limits

Adapts to Your Hardware
Comprehensive
Easy to Use

And Much, Much More

Send for brochure
and sample printouts.

Family Roots
includes de-
tailed manual
and 2 full dis-
cettes of pro-
grams for your
Apple II⁺ or
IBM PC⁺



**Family
Roots**
QUINSEPT, INC.

Other genealogy soft-
ware also available.

Price
\$189 plus
\$3.50 Postage
Visa, Master
card Accepted
*EFT
Apple Computer Inc.

P.O. Box 216, Lexington, MA 02173 • (617) 862-0404

IBM[®] XT COMPATIBLE OEM COMPONENT SALE

Computer Case \$150.00
Key Board-KT5150 \$169.00
Power Supply \$175.00
Mother Board-Bare \$ 95.00
Mother Board without ICs \$225.00
Mother Board with ICs \$395.00

Dealers/OEM Buyers
Quantity Discounts Available
All items are 100% XT compatible as
replacement kits. Boards with ICs are
tested and burn-in with 1 year warranty.
Evaluation units are available at \$2.500
with 128K RAM, 10M Hard Disk, Floppy
Drive and RGB Card

Price change without notice

Call for current prices

IBM is a trademark of
International Business Machine



HiTech International, Inc.
1180 Miraloma Way, Suite M
Sunnyvale, CA 94086
(408) 738-6681 TLX 969422 HITECH

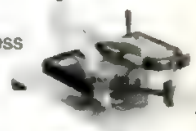
CUT RIBBON COST

Re-ink
most
fabric
ribbons
with only
one machine



INK MASTER
\$159.00

- No Fuss No Mess
- Simple to Use
- Versatile
- Adjustable



E-ZEE INKER
\$39.50

**BORG
INDUSTRIES**

525 Main Street
Janesville, Iowa 50647

ORDER TOLL-FREE:
800-553-2404
In Iowa: 319/987-2976
Visa MC accepted

HIDEY

10MB Hard Disk
for PC and compatibles



Keyboard Hideout

Multiple power outlets
Integrated appearance
Plus ... low price

Personal Micro Computers, Inc.

275 Santa Ana Court Sunnyvale CA 94086
(408) 737 8444

CIRCLE 552 ON READER SERVICE CARD

*IBM COMPATIBLE

64K

DYNAMIC RAM MEMORY I.C.'s

***4164-150ns \$2.75**

OEM • WHOLESALE • RETAIL

4164-150/200 2.75

128K (FOR IBM AT) CALL

256k 17.95

JA551-2 1/2 High 139.95

10MB HD W/CONTROLLER... 699.00

20MB HB (FOR IBM AT)..... 850.00

40MB HD (FOR IBM AT)..... CALL

IBM PC/XT/AT CALL

—Quantity Discounts Available— UPS Cash COD—

Credit Cards— P.O. on Approval

All New Quality Low Prices Subject to Change

Some Day Shipping (Usually) Add \$2.50 for shipping.

Over 1 lb. may require more. Add 3% for Credit Cards

MICROTEK, INC.

26541 Baldwin Road

Dearborn Heights, Michigan 48127

(313) 277-2862

*Trademark of IBM Corp.



Apple Macintosh, IBM-PC, XT, hard
disks, Eagle, Compaq, Columbia, NCR
Olivetti, Leading Edge.

All peripherals and Components

Printer: Epson, Okidata, Genim, Radix,
NEC, Plotters/printers.

Monitors: Disk

Drives, Modems, Diskettes

SOFTWARE FOR PC & MULTIUSERS

SOURCE COMPUTERS

COMPUTER EXPO, INC

(213) 208-0352 (213) 208-0259

(213) 906-1984 (213) 906-1634

IBM SPECIAL PC

\$2,449

256K

2 Floppies 360K controller

KEYBOARD \$125 IBM COLOR CARD \$249
PLANTRONICS COLOR PLUS \$379
immediate availability

IBM — XT in stock!! \$ CALL

COLUMBIA CORONA EAGLE XT SEEQUA SCALL

BHRT- NEVADA (800) 845-5555
ORDERS & INFORMATION (702) 451-3305
P.O. BOX 50029 HENDERSON NV 89016 Mon-Fri 7:00 AM 5:30 PM

CIRCLE 556 ON READER SERVICE CARD

PC EXPANSIONS

Qume 142A	\$199
Teac FD55B	\$149
Tandon TM100-2	\$179
Tandon TM101-4	\$295
CDC 9409	\$179
Amdek AmdiskV	\$119
Case and PS	\$ 45
Maynard Disk Controller	\$114
Sandstar Series	\$call
Internal 10MB HD systems WS1	\$899
WS2	\$1079
Quadboard (64K)	\$259
Quadboard (384K)	\$419
Quadcolor I	\$199
AST SixPakPlus (64K)	\$259
SixPakPlus (384K)	\$419
MegaPlus (64K)	\$269
I/O Plus	\$129
AST-3780	\$659
PCnet - starter kit	\$809
MonographPlus S	\$389
HERCULES graphics board	\$349
HAYES Modems 300	\$209
Smartmodem 1200	\$489
Smartmodem 1200B	\$419
Set of 9 chips (64K)	\$ 32
256K chips (each)	\$ 23
8087 chip	\$169
Verbatim DataLife DS, DD (20)	\$ 49

VLM Computer Electronics
10 Park Place • Morristown, NJ 07960
(201) 267-3268 Visa, MC, Check or COD

CIRCLE 558 ON READER SERVICE CARD

ICs PROMPT DELIVERY!!!
SAME DAY SHIPPING (USUALLY)

OUTSIDE OKLAHOMA NO SALES TAX

8087-3	Co-Processors	\$124.97
DYNAMIC RAM		
256K	256Kx1 120 ns	\$19.97
256K	256Kx1 150 ns	\$14.99
64K	64Kx1 150 ns	2.75
64K	64Kx1 200 ns	3.15
EPROM		
27256	32Kx8 300 ns	\$36.25
27128	16Kx8 250 ns	13.57
27C64	8Kx8 200 ns	11.87
2764	8Kx8 300 ns	4.87
2732A	4Kx8 250 ns	6.37
2716	2Kx8 450 ns	3.21
STATIC RAM		
6264P-15	8Kx8 150 ns	\$19.57
6116P-3	2Kx8 150 ns	4.37

QUANTITY ONE PRICES SHOWN

OPEN 6 1/2 DAYS. WE CAN SHIP VIA FED-EX ON SAT

Factory New, Prime Parts
MICROPROCESSORS UNLIMITED
24 000 South Peoria Ave.
B'ham, AL 35221 (918) 267-4961

Prices shown above are for December 24, 1984

Please call for current prices & volume discounts. Prices subject to change. Please specify region & clear prices on some parts due to supply & demand at any time. Shipping rates. Shipping & insurance extra. Cash orders receive 3% discount. Orders not over \$500.00. All orders to be shipped by the next morning, via Federal Express Standard, 48 Hrs.

CIRCLE 559 ON READER SERVICE CARD

3M diskettes

5 1/4"

Specify soft, 10 or 16 sector Minimum Order 50

Single sided double density	1.55 ea
Double sided double density	2.08 ea

Certified Check - Money Order - Personal Check - Allow up to 2 weeks for personal checks to clear. Add \$3.00 per 100 or part to each order for UPS shipping charges.
NJ Residents add 6% sales tax

DATA EXCHANGE INC.
178 Route 206 South, P.O. Box 993
Department C
Somerville, N.J. 08876 • (201) 874-5050

CIRCLE 553 ON READER SERVICE CARD

LEE GEE DATA corporation

SOFTWARE SALE!!

LOTUS 123	\$299
SYMPHONY	\$440
MULTIPLAN	\$199
D BASE II	\$289
D BASE III	\$379
FRAMEWORK	\$399
KNOWLEDGEMAN	\$289
R 4000	\$269
MULTIMATE	\$259
MULTIPLAN MICROSOFT	\$125
DESK ORGANIZER	\$165
HARVARD PROJECT MANAGER	\$239

HARDWARE SALE!!

QUADBOARD—384K (POPULATED)	\$459
MULTI-FUNCTION BOARD	\$359
256K (POPULATED) 1 YEAR WRTY	
HERCULES COLORGRAPHICS CARD	\$330
COLOR GRAPHICS CARD 1 YEAR WRTY	\$159
MEMORY EXPANSION BOARD	\$365
384K (POPULATED) 1 YEAR WRTY	
MEMORY EXPANSION BOARD	\$265
256K (POPULATED) 1 YEAR WRTY	
PRO MODEM 1200B	\$251
HAYES SMART MODEM W/SMART COM II	\$472

CALL TOLL FREE
1-800-237-8830
2410 E. BUSCH BLVD ST 314
TAMPA, FL 33612
VISA MC, CHECK OR C.O.D.

CIRCLE 558 ON READER SERVICE CARD

THE BUYERS GUIDE

THE MASTER DIRECTORY OF PRODUCTS FOR THE IBM PC, PC XT, PCjr AND MOST COMPATIBLES!

AVAILABLE AT YOUR LOCAL NEWSSTAND AND COMPUTER STORE.

CIRCLE 554 ON READER SERVICE CARD

BEFORE YOU BUY ANOTHER PIECE OF SOFTWARE

CONSULT THIS BUYER'S GUIDE

SOFTWARE BUYER'S GUIDE

Selecting the programs, systems, and games for your personal computer can be an ordeal. You want the best package that's compatible with your system—at the right price!

LOOK NO FURTHER. THE OLYMPIC EDITION OF THE CREATIVE COMPUTING 1984 SOFTWARE BUYER'S GUIDE IS HERE!

The Editors of CREATIVE COMPUTING have awarded the Olympic Gold, Silver and Bronze medals to the leading software packages in Education, Word-Processing, Spreadsheets, Games and Database Packages...Full product descriptions, reviews and screen photos help you choose the package you need and want!

You also get a complete directory of software products for the Apple, Atari, Commodore 64, TRS-80 Color Computer and IBM PC, with price, system requirements and program descriptions that help you select, not settle.

A full listing of software manufacturers, with names, addresses, types of software and compatible hardware requirements makes this the most complete software guide on sale today!

ORDER YOUR COPY TODAY!
Also available at your local newsstand and computer store.

SOFTWARE BUYER'S GUIDE
CN 1914, Morristown, NJ 07960

YES! I'm enclosing \$4.95 (\$3.95* plus \$1.00 postage and handling) for the 1984 SOFTWARE BUYER'S GUIDE. (Outside USA \$6.00.)

Mr./Mrs./Ms. _____ print full name

Address _____

City _____

State/Zip _____

*Residents of CA, NJ and NY State add applicable sales tax

CIRCLE 554 ON READER SERVICE CARD

Computerclassics

Software

Data Base Manager II
Electric Desk

dBase II
dBase III
Framework

Sidekick
Sidekick (unprotected)
Turbo Pascal
Turbo Pascal (8087)
Toolbox

Home Accountant Plus
Tax Advantage

Chartmaster

C Basic Compiler
C Language

Quickcode III

Word Processor
Word Processor w/ Mailmerge
Nutshell

310A

Megaplug 64k
Six Pac Plus 64k

Intellimodem XL
Intellimodem XT
Intellimodem ST

Prowriter 8510
Prowriter 1550
Starwriter 20 CPS

170.00
189.00

279.00
369.00
369.00

35.00
60.00
35.00
69.00
35.00

82.00
42.00

250.00

360.00
209.00

155.00

85.00
115.00
115.00

Lattice C Compiler

Volkswriter Deluxe

Thinktank

Lotus 1-2-3
Lotus Symphony

Andrew Tobias—Managing Your Money

Knowledge Man
K Graph
K Paint
K Text

PC Draw

Wordstar
Wordstar Propack
Wordstar 2000
Infostar +
Chartstar

R Base Series 4000
Extended Report Writer
Clout II

160.00

269.00
269.00

355.00
355.00
325.00

339.00
619.00
550.00

Smartmodem 1200B
Smartmodem 1200

Graphic Card
Color Card

Microline 82A
Microline 84A
Microline 92P
Microline 93P

HX12 Color Monitor
Max 12 Amber

299.00

169.00

129.00

309.00
435.00

119.00

285.00
130.00
59.00
99.00

299.00

189.00
279.00
269.00
279.00
190.00

279.00
89.00
145.00

Word
Word w/ Mouse
Multiplan
Basic Compiler
Fortran Compiler
Project
Chart

Crosstalk
Infoscope

Multimate

Word Perfect

PFS Report
PFS File
PFS Write
PFS Proof
PFS Access
PFS Graph

Supercalc III
I.U.S. Order Entry
I.U.S. Accounts Receivable
I.U.S. Accounts Payable
I.U.S. Inventory Control
I.U.S. General Ledger
Series Plus (I.U.S. window)

239.00
299.00
129.00
229.00
229.00
159.00
159.00

99.00
125.00

279.00

269.00

69.00
85.00
85.00
60.00
60.00
85.00

219.00
279.00
279.00
279.00
279.00
59.00

1315.00

Toshiba 1351

IBM

IBM PC-2 Drives-256k

PC JUNIOR

Electric Desk
Wordstar
Home Accountant Plus

409.00
485.00

339.00
165.00

329.00
749.00
425.00
669.00

479.00
185.00

1749.00

179.00
99.00
57.00

HOURS
Order desk & technical support open:
8 a.m. to 6 p.m. Monday-Friday
10 a.m. to 2 p.m. Saturday

SHIPPING
\$4 per item UPS surcharge (\$8 for Blue Label); printers \$25
TO ORDER CALL:
1 (800) 328-4473 or
(818) 705-1895 (CA)
6934 Canby Street Suite 104
Reseda, CA 91335

TERMS
All prices subject to change. We honor Cashiers Check / MO / Bank
Transfers immediately. Allow time for company & personal checks
to clear. California residents add sales tax.

**Incredible Prices with
Professional Support!**

- Corporate accounts welcome
- We accept VISA & MasterCard
- No credit charge surcharge
- Free technical support

FREE PRODUCT INFORMATION AND UNBELIEVABLE SAVINGS TO



TM

Void after June 15, 1985

03 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
28 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
53 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
78 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
03 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
28 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
53 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
78 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
03 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
28 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
53 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
78 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
03 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
28 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
53 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
78 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500
03 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525
28 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550
53 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575
78 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600
03 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625
28 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650
53 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675
78 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700
03 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725
28 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750
53 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775
78 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800
03 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825
28 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850
53 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875
78 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900

PRINT CLEARLY—Use only one card per person.

PHONE NO. ()

NY TITLE

IS APT.

STATE ZIP

must be included to insure delivery.)

PC 2/19-2

lease send me one year (26 issues) of PC Magazine for \$29.97 and bill me.
full one year subscription price of \$34.97.)

Void after June 15, 1985

03 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
28 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
53 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
78 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
03 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
28 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
53 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
78 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
03 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
28 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
53 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
78 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
03 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
28 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
53 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
78 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500
03 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525
28 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550
53 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575
78 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600
03 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625
28 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650
53 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675
78 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700
03 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725
28 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750
53 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775
78 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800
03 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825
28 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850
53 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875
78 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900

PRINT CLEARLY—Use only one card per person.

PHONE NO. ()

NY TITLE

IS APT.

STATE ZIP

must be included to insure delivery.)

PC 2/19-1

lease send me one year (26 issues) of PC Magazine for \$29.97 and bill me.
full one year subscription price of \$34.97.)





NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. BOX 13848
PHILADELPHIA, PA 19101



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. BOX 13848
PHILADELPHIA, PA 19101



PC Product Index

RS#	PRODUCT	ADVERTISER	PAGE#
DISK OPERATING SYSTEMS			
537	QIC-01	Qic Research Inc.	72
537	QIC-04	Qic Research Inc.	72
ACCOUNTING SOFTWARE			
112	Shoe Box Accountant	Cyma Corp.	52
260	Versa Business Series	H & E Computronics	334
224	Bottom Line Five	Ilar Systems Inc.	330
*	Multiplan	Microsoft	110,111
420	Real World Software	Real World Software	5
INTEGRATED ACCOUNTING PACKAGES			
*	Windows	Indian Ridge Enterprises, Inc.	11
470	dBASE II/Accounting Software	SBT Corp	16
TAX AIDS			
114	Tax Time-1040	Austin Scientific	20
131	Tax Program	Best Programs	99
327	Tax Preparer	Howardsoft	53
323	The Tax Surgeon	Taxbyte Inc.	243
COMMUNICATIONS SOFTWARE			
326	Crosstalk	Micro Stuff Inc	225
333	Transporter	Micro Stuff Inc	28
OTHER UTILITIES			
152	Copy II PC	Central Point Software	224
514	Printworks	Softstyle	80
475	Apple Turnover	Vertex Systems	66
PORTFOLIO MANAGEMENT			
407	Electronic Investment Center	Spear Securities	147
GRAPHICS SOFTWARE			
184	Photobase	Chorus Data Systems	29
311	PC Draw	Micrograph	82
502	PC Paintbrush Software	Tecmar Inc	C-4

RS#	PRODUCT	ADVERTISER	PAGE#
INFORMATION MANAGERS			
212	Spotlight	Software Arts	112-113
SOFTWARE FOR PROFESSIONALS			
150	Sidekick	Borland International	12-13
120	Northeastern Software	Northeastern Software	148
335	Mother Jones Sons' Software	Mother Jones Sons Software Co.	55
ENGINEERS/SCIENTISTS			
331	8087 Chip	Microway	92
STATISTICAL SOFTWARE			
521	Statpro	Wadsworth Professional SW	22
WORD PROCESSING SOFTWARE			
280	Word Processing	Leading Edge	88
350	Mass 11	Microsystems Engineering Corp.	100-103
509	XYWrite	XYQuest	257
154	Word Perfect	Satellite Software Int'l (SSI)	44, 45
WORD PROCESSORS			
395	Volkswriter Deluxe	Lifetree Software	271
534	Wordstar 2000	Micropro International	26, 27
MULTIFUNCTION SOFTWARE			
272	Smart Software	Innovative Software	114, 115
501	Treasure Chest	Tecmar Inc.	C-2
EDUCATIONAL SOFTWARE			
387	Total Telecommunications	Tele Learning Systems	223
INTEGRATED SOFTWARE			
388	Intruit	Noumenon Corp	254
494	Ability	Xanaro Technologies, Inc.	2, 3

PC PRODUCT INDEX

RS#	PRODUCT	ADVERTISER	PAGE#
-----	---------	------------	-------

ENTERTAINMENT SOFTWARE

171	Golf Program	One Step Software	264
387	Total Telecommunications	Telelearning	223

COMPILERS

149	Borland Turbo Pascal Compiler	Borland International	21
-----	-------------------------------	-----------------------	----

OTHER LANGUAGES

353	20/20 Bar Code	Norand	37
391	Language Software	The Programmers Shop	255

DATA BASE MANAGERS

218	Revelation	Cosmos, Inc.	104
525	Knowledge Man	MDBS	94, 95
*	Database Manager	Potomac & Pacific Engineering	4
193	DataEase	Software Solutions	97

PROGRAM DEVELOPER/GENERATOR TOOLS

246	Quickcode III	Fox & Geller	160
-----	---------------	--------------	-----

TEXT EDITORS

182	SPF/PC	Command Technology Corp.	272
378	Kedit	Mansfield Software Group	282

OTHER UTILITIES

239	Personal Copier	Disk Tech	320
306	Sideways	Punk Software	183
136	Data Padlock	Glenco Engineering	99
303	LePrint	LeBaugh Software Corp.	234
340	Disc Mechanic	MLI Microsystems	320
335	Utility Tool	Mother Jones Son's Software Co.	55
346	Power Utilities	Norton Utilities, The	266
268	Hard Runner	Nostradamus	96
527	File Transfer	Personal Computer Products	224
*	Copywrite;	Quaid Software LTD	307
136	Padlock II	Glenco Engineering	99

HARDWARE

168	Computers	Jameco Electronics	274
-----	-----------	--------------------	-----

RS#	PRODUCT	ADVERTISER	PAGE#
-----	---------	------------	-------

IBM PC COMPATIBLE COMPUTERS

237	Ericsson PC	Ericsson	114, 115
276	IBM PCjr	IBM Corp.	24, 25
140	Senior Partner	Panasonic Industrial Co.	58

ACCESSORY CARDS

409	Fast Card	Thesys Memory Products Corp.	63
-----	-----------	------------------------------	----

MULTIFUNCTION BOARD

540	Ultra Pak	Tseng Labs	23
101	Six Pak Plus	AST Research	84, 85
486	Quadboard	Quadram Corp.	32
356	BigPlus	Quibic	87
430	Rio Plus II	STB Systems	C-3
501	Multifunction Boards	Tecmar Inc.	C-2
537	QIC-05	Qic Research Inc.	72

VIDEO/GRAPHICS BOARD

145	Hercules Graphic CD	Hercules computer technology	8
146	Hercules Color Card	Hercules Computer Technology	43
*	Modular Graphics Card	Paradise Systems	228
501	Graphics Master Board	Tecmar Inc.	C-2

OTHER ACCESSORY CARDS

256	Coaxial Board	Emulex Persyst	244
187	Color 400	Sigma Designs	151
537	QIC-06	Qic Research Inc.	72

INPUT HARDWARE

250	The Light Pen Tektronix 40	FTG Data Systems	73
507	Touchstone I	Touchstone Technology, Inc.	108

MASS STORAGE HARDWARE

247	Bubble Memory Board	Helix Laboratories	208
317	Megaflight 100	Kamerman Labs	10
437	Race for Space	Maynard Electronics	38
373	Hard Disc Drive	Space Coast Systems, Inc.	275
538	Disk Subsystem	Statewide Micro Electronics	47
*	Disk Drive, tape Backup	Sygen Inc.	56

PC PRODUCT INDEX

RS#	PRODUCT	ADVERTISER	PAGE#
COMMUNICATIONS HARDWARE			
165	24000 Modem	Hayes Microcomputer Products	161
MODEM			
387	Total Telecommunications	Telelearning	223
109	Ameritec Modem	Ameritec	86
537	QIC-03	*Qic Research	72
NETWORKING			
412	PC NET	Orchid Technology	142
OTHER COMMUNICATIONS HARDWARE			
158	Hard Disk	Complete Management Systems	320
DISPLAYS/MONITORS			
383	Qubie Hard Disk Drive	Qubie	61
372	Sony Trinitron Monit	Sony Information Systems Co.	235
489	Taxan Monitors	Taxan	36
PRINTERS			
309	Dot Max 9	Fujitsu America, Inc.	154
*	TI 885	Texas Instruments	9
162	Printers	IBM-ISC Division	107
DOT MATRIX			
113	Printeks	Citizen America Printer	30, 31
PLOTTERS, ETC.			
300	Plottek	Houston Instruments	152
PRINTER DRIVERS			
175	Letter Boss	Connecticut Software	76
175	Printer Boss	Connecticut Software	76
175	Sidekick	Connecticut Software	76

RS#	PRODUCT	ADVERTISER	PAGE#
VOICE SYNTHESIZERS/SOUND RELATED HARDWARE.			
342	Voice Recognition Equipment	NEC America/New Product Divisi	17
FURNITURE			
199	CompuCart	CompuCart	232
DISKETTES			
289	Dysan Diskettes	Dysan	14
517	Maxell Floppy Disks	Maxell Corp of America	1
SOFTWARE SECURITY SYSTEMS			
508	Prolok	Vault Corp	69
KEYBOARD OVERLAYS			
441	PC-DocuMate	Systems Management Assoc	240
OTHER SUPPLIES			
121	Dust Covers	Contemporary Computerwear	320
245	Computer Supplies	Elek-Tek	236
225	PC Support	Iamac	275
454	Wire Tree	Network	215
148	The Rolltop 100 Disk File	Microcomputer Accessories	282
148	Tik 'N Turn	Microcomputer Accessories	282
148	Keyboard Storage Drawer	Microcomputer Accessories	282
LITERATURE			
176	Periodicals	Data Sources	262
349	The Manual	Management Information Service	279
ORGANIZATIONS & SERVICES			
216	Data Decisions Microcomputer Information Service	Data Decisions	78, 79
370	NewsNet	NewsNet	46
*	Computer Insurance	Safeware	255

The publisher does not assume any liability for errors or omissions in the product index.

We will make it easy to get the

HARDWARE

AST RESEARCH
AST 6-PACK PLUS multi-function board. 64K-384K.
 6-Pack Plus 64K259.95
For game port option add 34.95

CURTIS
SURGE PROTECTORS
 Diamond39.95
 Ruby69.95
 Emerald49.95
 Sapphire59.95

DCA INC.
 Irma Board 3278 Emulation ..899.95

IQ TECHNOLOGY
 Smart Cable (RS-232C)79.95
Specify male or female to computer.

KEYTRONICS
 New! KB-5151 keyboard174.95
 KB-5150159.95

KENSINGTON
 MasterPieceSee Box

KOALA PAD
 KoalaPad99.95
 Game Port Card39.95

KRAFT
 Joystick36.50

MICRO MAX
 Color Max269.95

MICROSOFT
 Mouse with software129.95

MOUSE SYSTEMS
 PC Mouse with PC Paint159.95

QUADRAM QUADBOARD
 New! Expanded Quadboard, expandable from 64K to 384K.
 64K249.95 384K509.95

TECMAR
CAPTAIN multifunction memory board expandable from 64K to 384K. with Treasure Chest Software.
 64K259.95

64K Memory Upgrade Set .42.95

DISK DRIVES

CDC DS/DD disk drive159.95

TANDON TM-100-2 DS/DD disk drive164.95

TEAC Half Height DS/DD disk drive149.95

HARD DISK DRIVES

ALLOY
 Cartridge back-up system for PC/XT & compatibles. 16.5 MB per single cart. Interface card included1749.00

DATAMAC TRUSTOR
 10 mega byte external hard disk drive with cabinet and power supply for IBM-PC. Interface card and controller included899.95
 FIXT Autoboot ROM for Trustor/1064.95

IOMEGA BERNOULLI BOX
 10 MB bernoulli box2295.00
 20 MB (2-10 MB in cabinet) .2795.00
 FIXT Autoboot ROM f/above ..94.95

TALLGRASS
 Hard drive sub system with backup. TG-3020 20 MB w/backup .See Box
 Controller for PC (req.)124.95
 DC-600 Data cartridge34.95

DISPLAY CARDS

AST Monograph Plus parallel/serial and clock calendar, Lotus 1-2-3 graphics compatible399.95

HERCULES Color Card179.95
 Graphics Card (Monoch.)....309.95

New! PARADISE Modular Graphics Card.....See Box
 Parallel port for above.....79.95

STB Graphix Plus II (Color and Monochrome)....349.95

MODEMS

ANCHOR AUTOMATION
 Express 300/1200
 RS-232 Modem279.95

HAYES
 Smartmodem 300199.95
 Smartmodem 1200 RS-232 ..479.95
 Smartmodem 1200B Internal with Smartcom II399.95

VEN-TEL
 PC Half Modem-Internal 300/1200 modem fits in short slot of XT or PC portable w/Crosstalk XVI 399.95
 1200 Plus-External 300/1200 .379.95
(Requires RS-232 Card and Cable)

10MB Internal Hard Drive for PC w/controller card, Auto boot, Low power.....749.95

MONITORS

PRINCETON
 HX-12 Hi-res RGB Color469.95
 MAX-12 Monochrome (to use with Monochrome Card) Amber ..184.95

TAXAN
 440-12" RGB ColorSee box
 420-12"-super hi-res RGB color419.95
 122-12"- Amber for PC *(requires monochrome card)* .139.95
 121-12"-green for PC *(requires monochrome card)* .149.95
 TATUNG 13" RGB.....429.00

FLOPPY DISKS

	SS/DD	DS/DD
IBM 5 1/4" (10 pk.).....		29.95
MAXELL 5 1/4"18.95		29.95
FUJI 5 1/4" (10 pk.)17.95		24.95
NASHUA 5 1/4" (10 pk.) .17.95		19.95

PRINTERS

BROTHER
 HR-15 13 CPS359.00
 HR-25 23 CPS649.00
 HR-35 36 CPS899.00
 Tractor Feed f/HR-15 or HR-25124.95
 Single Sheet Feeder for HR-15 or HR-25.....199.95

DIABLO
 630 API letter quality1299.95
 Tractor Feed269.00
 Parallel Cable for 630 to PC ..45.00
 Single Sheet Feeder for 630 .479.95

EPSON
 RX-100 ...399.95 RX-80 F/T.289.95
 FX-80 ...379.95 FX-100 ...599.95
 RX-80 ...239.95 JX-80 Color599.95

JUKI
 6100 18 CPS Letter Quality ..409.95

NEC
 8850 letter quality1795.00
 3550 letter quality 33 CPS ..1379.00
 2050 letter quality, 18 CPS ..749.95
 Tractor Feed 3550/2050209.95

OKIDATA
 OKI-92 ...379.95 OKI-93 ..629.95
 OKI-84349.95

OLYMPIA
 Compact R/O parallel and serial letter quality369.95

PANASONIC
 KXP-1090 80 CPS F/T.....239.95
 KXP-1091 120 CPS F/T.....329.95

QUME
 SPRINT II/55 plus 55 CPS with interface1599.00
(Specify IBM PC parallel or standard Centronics parallel).

SILVER REED
 EXP-550 19 CPS439.95
 EXP-770 36 CPS799.00
 Tractor Feed for EXP-550 ..124.95

TEXAS INSTRUMENTS
 855 with Tractor Feed799.95

TOSHIBA
 P1351 Printer.....1279.00
 P1340 Printer.....769.95

HARDWARE SPECIALS

PARADISE

Modular Graphics Card

\$279⁹⁵

TAXAN 440

12" Super Hi Res RGB color monitor

\$994⁹⁵

TALLGRASS TG-3020

20MB Hard Drive with Cartridge Back-up

\$2495⁰⁰

KENSINGTON Master Piece

\$119⁹⁵

ACCOUNTING SYSTEMS

MBSI (Real World) ACCOUNTING

General Ledger, Acct's Payable, Acct's Receivable, Inventory Control, Order Entry/Billing, Payroll**\$359⁹⁵ each**

Sales Analysis **\$249⁹⁵**

STATE OF THE ART ACCOUNTING

General Ledger, Accounts Receivable, Accounts Payable, Inventory, Payroll**\$409⁹⁵ each**

Budget and Financial Reporting, Sales Invoicing *(Requires Accounts Receivable)*

\$379⁹⁵ each

Professional Time and Billing

\$594⁹⁵

SOFTWARE

ALPHA
 Electric Desk199.95
 Data Base Manager II169.95

ASHTON TATE
 Dbase II279.95
 New! Ashton Tate DBASE III 359.95
 Ashton Tate Framework359.95

BILL BRIGHT ROBERTS
 Graphix Partner84.95

BORLAND
 Turbo Pascal34.95
 Side kick (protected)34.94
 Side kick (non-protected).....59.95

BRODERBUND
 Bank Street Writer56.95

BPS
 BPS-Business Graphics *(requires color card)*.....209.95

CBS SOFTWARE
Managing for Success
 People Management59.00
 Personal Development.....59.00
 Micro SpeedRead87.50
 Mastering The SAT99.50

DOW JONES
 Connector29.50
 Investment Evaluator99.95
 Market Analyzer *(req. color card)* ..239.95
 Market Manager199.95
 Market Microscope239.95
 Spread Sheet Link189.95

DAYFLO
 Dayflo 1.1 (XT/256K)339.95

ENERTRONICS
 Energraphics *(req. color card)* 229.50

FOX & GELLER for DBase
 Quick Code*139.95
 Dutil*44.50
 DGraph*149.95
 *For DBase II or III. Please specify

OZ *(req. 256K & color card)*209.95
RGraph *(for RBase 4000)*149.00

FUNK SOFTWARE
 Sideways44.95

HARVARD SOFTWARE
 Harvard Project Manager ...219.95
 New! Total Project Manager .269.95

HARVARD ASSOC
 PC Logo *(req. 128K/color card)*99.95

HAYDEN
 Sargon III.....32.95

HAYES
 "PLEASE" Data Base229.95

HERITAGE SOFTWARE
 Smartkey II49.95

HOWARD SOFTWARE
 Howard Tax Preparer 1985. See Box

HUMAN EDGE
 The Management Edge (128K) 165.00
 The Sales Edge (128K).....165.00

IMSI
 PC Paintbrush *req. mouse & color card*79.95

INNOVATIVE SOFTWARE
 Smart Software System
Includes: Spreadsheet, Word processor & Data manager. 599.95

LIFE TREE
 Volkswriter Deluxe159.95

LIVING VIDEOTEXT
 Think Tank *(req. 256K)*.....109.95

MECA
 Andrew Tobias Managing Your Money (128K)119.95

MEDIA CYBERNETICS
 Dr. Halo69.95

MENLO PARK
 In SearchSee Box

MICRO DATA BASE SYSTEMS
 Knowledge Man 1.7264.95

MICRO PRO
 Wordstar Pro Pack249.95
 Wordstar 2000See Box

PC and all that goes with it!

SOFTWARE SPECIALS

WARNER Desk Organizer for PC/XT/AT	\$129⁹⁵
MICRO PRO Wordstar 2000	\$259⁹⁵
HOWARD Howard Tax Preparer 1985	\$194⁹⁵
IN SEARCH by Menlo Park	\$279⁹⁵
THOUGHTWARE Trigger	\$339⁹⁵

- No surcharge for credit cards. 
- Prompt and efficient service. 
- Extensive inventory of PC products. 
- Knowledgeable and experienced sales staff.

We stock an extensive inventory on
IBM PC/XT/AT®, Apple®, AT&T®, Kaypro®,
Compaq®, Olivetti®, Canon® and Zenith®.

Remember Our Name — It's all the Memory You Need.

47st. Computer

Computers and Business Equipment®

A Division of 47st. Photo Inc.

67 W. 47th St. • 115 W. 45th St.
NYC CA LIC. # 800189/691860 NYC CA LIC. # 800191

39 Ann Street Near City Hall
and the World Trade Center

Mail Order Address: 36 East 19th Street
New York, N.Y. 10003

212-260-4410

TOLL-FREE
OUT-OF-STATE **800-221-7774**

STORE HOURS:
Sunday 10-4, Monday-Thursday 9-6, Friday 9-2

We accept MC, Visa, American Express & personal checks (no delays if approved). Minimum shipping and handling \$4.95. Software found to be defective will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within the warranty period of manufacturer. Defective items must be sent to 36 East 19th Street, New York, N.Y. 10003, Attn: Service Dept. Prices herein are for mail & phone orders only. Store prices may differ. Some items are subject to availability. Due to manufacturers price fluctuations, the prices may change beyond our control. This ad supersedes all previous PC ads.

Keep in touch with the latest items on the market and our up-to-date sale prices by checking our weekly ads in the National editions of the N.Y. Times and Wall Street Journal.

IBM® is a registered trademark of International Business Machines Inc.

PC Magazine Feb. 19, March 5, 1985/PC World March 1985, Submitted Dec. 15, 1984

PROGRAMMERS CORNER

Lattice-C Compiler	295.95	P-Fix 86 Plus Debugger ..	299.95
C-Food Smorgasboard ...	109.95	Morgan Prof. Basic	79.95
Lattice Windows	219.95	Trace 86	99.95
Panel for Lattice-C	219.95	Halo f/Lattice-C	149.95
P-Mate Text Editor	159.95	B-Trieve	195.50
Plink-86 Overlay Linker ..	299.95	X-Trieve	169.95

THE GREEN LEAF FUNCTIONS

General Library	134.50	Async Comm. Library ...	124.95
-----------------------	--------	-------------------------	--------

MICRORIM

RBase 4000 (requires 250K)	259.95
Extended Reportwriter	96.50
New! Clout 2.0	149.95

MICROSOFT

Chart	159.95
New! Flight Simulator	34.95
Multiplan	129.95
Word w/Mouse & Speller 1.15	269.95

MICROSTUF

Crosstalk XVI	99.95
---------------------	-------

MONOGRAM

Dollars and Sense New!	119.95
------------------------------	--------

MULTIMATE

Multimate Version 3.3	249.95
-----------------------------	--------

NOUMENON

Intuit Integrated software	68.95
----------------------------------	-------

OSPREY ACCOUNTING SYSTEM

Accounts Receivable	219.95
Accounts Payable	219.95
General Ledger	219.95
Inventory	219.95
Sales	219.95
Invoicing	219.95

PETER NORTON

Norton Utilities 2.01	49.95
-----------------------------	-------

POWER BASE SYSTEMS

Power Base 2.0	259.95
----------------------	--------

PRENTICE HALL

Execuvision (req. color card) ..	259.95
----------------------------------	--------

PROFESSIONAL SOFTWARE

Word Plus PC with BOSS ...	279.50
----------------------------	--------

ROSESOF

Prokey 3.0	84.95
------------------	-------

SIMON & SCHUSTER

Typing Tutor III	32.95
------------------------	-------

SOFTSTYLE

SET-FX + (f/Epson FX printers)	49.95
Printworks	48.95

SORCIM

Supercalc 3 release 2	199.95
-----------------------------	--------

SOFTREND

Aura (DOS 2.0/256K)	329.95
---------------------------	--------

SOFTWARE PUBLISHING

PFS File ..	89.95	PFS Graph	89.95
PFS Report	79.95	PFS Write	89.95

SSI

Word Perfect with Speller 4.0	249.00
-------------------------------	--------

STATE-OF-THE-ART

The Bookkeeping System	359.95
-----------------------------	--------

SOFTWARE ARTS

TK Solver	259.95
-----------------	--------

SUMMA SOFTWARE

Traders Accountant	299.95
Winning on Wall Street	
Traders Data Manager	139.95
Traders Forecaster	169.95
The Complete System includes above three	469.95

THE SOFTWARE GROUP

Enable	399.95
--------------	--------

THOROUGHbred

Photosynthesis: unlocking the power of the sun	36.95
Exploring that amazing food factory, the leaf	36.95
How plants grow: the inside story ..	36.95
The fascinating story of cell growth	36.95
Molecules & atoms: exploring the essence of matter	36.95
The how's and why's of migrating molecules	36.95
Decimals made simple	36.95
Taking the mystery out of metrics ..	36.95
Mastering units of measurement ..	36.95

THOUGHTWARE

Assessing Personal Management Skills	239.95
Managing Time Effectively ...	299.95
Leading Effectively	299.95
Trigger	See Box

VM COMPUTING

Relay Communication	99.50
---------------------------	-------

WARNER SOFTWARE

Desk Organizer	See Box
----------------------	---------

WESTERN UNION EASY LINK

Instant Mail Manager	59.95
----------------------------	-------

Copies everything



personal Copier™

Our monthly trade-in plan guarantees you can always copy everything!

Personal Copier makes sure you're always up-to-date with the new and everchanging protection methods. You won't find an easier system. It's fully automatic, with easy-to-use two-step graphic screen instructions. Anyone can use it... every IBM PC user should have one. Order your Personal Copier today. \$39.95 plus \$3.00 shipping and handling.

personal Copier™
from

DISK-TECH

P.O. Box 162 • Wasca, IL 60183

312/365-2803



CIRCLE 239 ON READER SERVICE CARD

COMPLETE YOUR LIBRARY OF



Add to your PC collection today. Make your personal library complete and authoritative with any issues you may be missing.

Copies are available for issues published during the last twelve months—be sure to specify the issues you want. If a particular issue is out of stock, your payment will be refunded promptly.

Back issues of PC are priced at \$6.00 each, postpaid. Outside USA, \$7.00 each.

PC

CN 1914, Morristown, NJ 07960

MCBI

Please send issues of PC listed below:

Issue	Qty.	Unit Price	Total Price
Payment Enclosed			\$

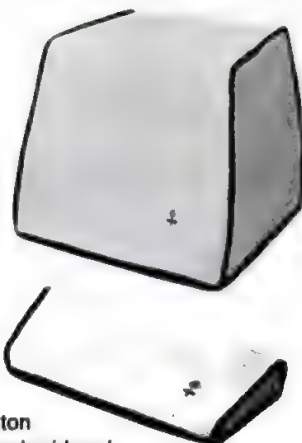
Mr./Mrs./Ms. _____ (print full name)

Address _____

City/State/Zip _____

Contemporary ComputerWear

DUST COVERS FOR THE IBM PC



Attire your IBM PC in Style!
ComputerWear—Beige, 100% cotton canvas covers with grey trim and embroidered emblem. Order Now! Satisfaction guaranteed. Custom logo in quantity.

- ☐ Yes, protect my PC in style! Send me:
- | | | | |
|-----------------------------------|------|--|------|
| ___ Keyboard | \$16 | ___ Printer (Epson FX-100,) | \$20 |
| ___ Monitor | \$18 | ___ NEC P3, Okidata 83, 93) | |
| ___ Drive | \$18 | ___ Printer (NEC 3550) | \$20 |
| ___ 1 pc Mon/Drive | \$36 | | |
| ___ Printer (Epson MX/FX-80 | \$18 | <input type="checkbox"/> Visa <input type="checkbox"/> MC <input type="checkbox"/> Check | |
| Okidata 82, 92) | | Add \$2.00 Shipping. Total: | |

(California residents add tax)

Print Name _____
Address _____
City/State _____ Zip _____
Credit Card # _____ Exp _____

Contemporary ComputerWear At: EM

1320-36th Ave. / San Francisco, CA 94122 / (415) 759-1466

IBM is a registered trademark of IBM Corp. Dealer inquiries invited. PC-AT covers available.

CIRCLE 121 ON READER SERVICE CARD

DISK MECHANIC

The ULTIMATE Backup, Analyze & Repair Utility
The Disk Toolkit NO IBM PC Should be Without
Protects Your Software Investment

BACKUP TOOLS:

- Can Backup Most Every Diskette
- SUCCEEDS where others fail!
- Works Manually or Automatically
- Create "Protected" Diskettes
- Many Additional Analysis Tools

FILE TOOLS:

- Show Disk & File Allocation
- Display & Alter File Data
- Repair Damaged Disks
- Recover Erased Files
- Alter "Hidden" Status
- Search Files For Data

SECTOR TOOLS:

- Examine/Print Sector Data
- Modify (ZAP) Sector Data
- Compare, Copy & Zero Sectors
- Search Sectors For Data

HACKER TOOLS:

- Modify Floppy Disk Controller Parameters
- Supports All FDC R/W Commands

DISK MECHANIC works with all standard IBM PC disk formats including "protected" diskettes with mixed track and sector sizes, blank and high track formatting, CRC errors, and single or double sided drives. DISK MECHANIC requires an IBM PC with 128K of memory or COMPAQ with 192K of memory, DOS 1.10, and 2 floppy disk drives. DISK MECHANIC includes a detailed 48 page instruction manual. To Order DISK MECHANIC send check or money order for \$70 plus \$3 for shipping (Mass. res. add sales tax.) to: MLI MICROSYSTEMS, Box 825, Framingham, Mass. 01701 or Call (617) 926-2055 for Mastercard or VISA orders. Dealer/Distributor inquiries welcome. ©1983 MLI MICROSYSTEMS.

MLI MICROSYSTEMS

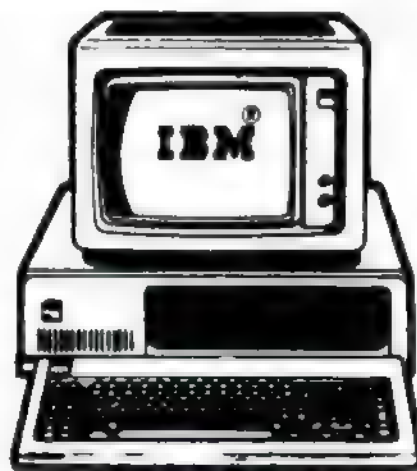
CIRCLE 340 ON READER SERVICE CARD

AMERICA'S NO. 1 IBM Systems Specialists

WE CUSTOMIZE IBM PC SYSTEMS

IBM PC \$1499

256K, two disk drives 360K each,
Drive Controller and Keyboard



IBMPC w/10MB

256K, one floppy Drive, Keyboard
10 MB Hard Disk with Controller
BOOTS FROM HARD DISK

\$2199

ALL SYSTEMS ARE CONFIGURED
AND TESTED AT NO EXTRA CHARGE

IBMPC w/30MB

256K, one floppy Drive, Keyboard
30 MB Hard Disk with Controller
and Booster Power Supply
BOOTS FROM HARD DISK

\$3299

★ PRICE WAR ★ CALL US LAST WITH YOUR BEST QUOTES ★

PRINTERS

EPSON RX-80 \$229 FX-80 \$389
RX-80FT \$279 FX-100 \$569
LQ-1500 Parallel \$1,099 Serial \$1199
LQ-1500 Tractor \$550 Cutsheet feeder \$399

OKIDATA 92P \$349
93P \$549
INCLUDES PLUG & PLAY 84P \$649

JUKI Ltr Quality, 18 CPS, 13" wide \$379
6100 Tractor \$129

TOSHIBA 1351 \$1299
Tractor \$169 Cut Sheet Feeder \$799

DYNAX DX-15 \$369
Keyboard \$149 Tractor \$99 Sheet Feeder \$199

BROTHER HR-25 \$599 HR-35 \$849
Tractor \$119 Cut Sheet Feeder \$199

QUME SPRINT 1140 \$1299
With IBM Interface Module 1155 \$1499

NEC SPINWRITER \$699
2050 \$1299
3550 \$1699
8850

NEC PINWRITER CALL
P2 CALL
P3

MONITORS

PGS MAX-12 Amber—Monochrome \$179
HX-12—Hi-Res Color \$429
SR-12—Super Hi-Res Color \$599
Scan Doubler CALL

TAXAN 440 Color - Super Hi Res \$549
122A(M) \$169 121G(M) \$159 116A(C) \$149

300A (Composite) \$159 300G \$139
AMDEK 310A (Mono) \$179

MODEMS

MICROCOM ERA 2 \$359
PC Internal 1200 Baud w/software, 4 Yr. Warranty

HAYES 1200 Standalone \$439
SMARTMODEM 1200B w/software \$369

QUBIE Standalone \$329 Internal \$299

POPCOM Internal or Standalone CALL

PROMETHEUS PROMODEM 1200 \$299

Minimum order \$100 Prices & availability subject to change. We ship UPS.
Shipping/handling charges vary. CDD requires cash, money order, cashier or certified
check only. For advance payment, please call first for workorder number. Personal &
Company checks take 3 weeks to clear. 20% restocking fee on returns. No PO's or
foreign orders.

HARD DRIVES

TALL GRASS TECHNOLOGY

20 MB w/20 MB Backup \$2,399
35 MB w/45 MB Backup \$3,799
70 MB w/60 MB Backup \$5,999
Controller Card \$140 Cartridge \$40

QUBIE 10MB CALL

EVEREX 10MB \$699

MAYNARD 10MB/30MB

10MB/WS-1 \$888 10MB/WS-2 \$1,029
30MB/WS1A \$1999 30MB/WS-2A \$2,099
WS-1 Gemini \$1049 WS-2 Gemini \$1149
"The Gemini" includes 10MB Hard Disk & Half Ht. Floppy

FLOPPY DRIVES

TEAC HALF HEIGHT 55B-DSDD \$109

CDC Full Ht. - DSDD \$139

TANDON 100-2 \$139
Full Ht. DSDD

★ SUPER SPECIALS ★

64K RAM Set of 9 chips \$25

HAYES 1200 Standalone \$439
SMARTMODEM 1200B w/software \$369

8087 CHIP \$109

JUKI 6100 \$399

MAYNARD 10MB/WS-2 \$1,029

IBM PC Keyboard (original) CALL

OKIDATA 92P \$349
93P \$549
INCLUDES PLUG & PLAY 84P \$649

BROTHER HR-25 (23CPS) \$599
HR-35 (36CPS) \$849

KEYTRONIC \$179
Deluxe Keyboard KB5151

ORCHID TECHNOLOGY

Blossom 64-K (to 384K) \$249
Turbo 186 CALL



NO SURCHARGE ON CDD, VISA or MC

AMEX 5%

NETWORKING

ORCHID TECHNOLOGY

PC Net PLUS Starter Kit \$799
PC netBlossom, PC turbo, PC netPlusRam CALL

IRMALINE

CALL FOR YOUR BEST PRICES

MULTI-DISPLAY CARDS

PERSYST Mono OR Color \$199
BOB Color CALL

AST MonoGraph Plus w/dock & PP \$369
Serial Port Option \$30

EVEREX Graphics Edge CALL

MYLEX CALL

TECMAR Graphics Master \$429

HERCULES Mono Graphics \$319
Color Graphics \$169

NEW STB Graphix Plus II \$299

VUTEK Color with Parallel & Serial CALL

PARADISE \$299
NEW Modular Card

MULTI-FUNCTION CARDS

ORCHID TECHNOLOGY

Blossom 64K (to 384K) \$249
PC net/upgrades CALL

NEW QUADBOARD O-K (to 384K) \$219

AST SIX PAK with 64K (to 384K) \$249

AST MEGA PLUS with 64K (to 512K) \$249

MISC. ADD ONS

8087 CHIP \$109

CABLE Parallel \$20 Serial \$25
Keyboard Extension, 6 ft. \$10

PLATINUM DISKETTES \$29
Box of 10

VERBATIM Datalife DSDD \$27
Box of 10

COMPUTER POWER P2 \$109
ACCESSORIES DIRECTOR P12 \$149

STANDBY 200 WATTS \$279
POWER SUPPLY 300 WATTS \$379

Surge Protection, up to 30 minutes Standby Power

WILL CALL: Please call first
for workorder number.

COMPU

805-498-6635

3541 OLD CONEJO ROAD, SUITE 102, THOUSAND OAKS, CA 91320

TELEX 888522

Ad #793

CIRCLE 234 ON READER SERVICE CARD

Index To Advertisers

RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page
109	Ameritec	86	121	Contemporary Computerware	320	*	Gollan Co. Inc.,	329
129	Applied Computer Products Inc.	90, 91	218	Cosmos	104	165	Hayes Microcomputer Products	161
101	AST Research	84, 85	112	Cyma Corp	52	260	H&E Computronics	334
114	Austin Scientific	20	216	Data Decisions	78, 79	247	Helix Laboratories, Inc ..	208
131	Best Programs	99	176	Data Sources	262	145	Hercules Computer	8
149	Borland International	21	116	Diamond Software	77	146	Hercules Computer	43
150	Borland International ..	12, 13	117	Discount Computer Centers	106	300	Houston Instruments	152
102	Bullish Investment Software	330	239	DiskTech	320	327	HowardSoft	53
152	Central Point Software, Inc	224	289	Dysan Corporation	14	162	IBM-ISG	107
184	Chorus Data Systems	29	230	800 Software	65	276	IBM-PC	24, 25
113	Citizen America Printer	30, 31	235	Eastern Enterprises	239	224	ILAR Systems	330
182	Command Technology Corp.	272	245	Elek-Tek	236	*	Indian Ridge Enterprises ..	11
158	Complete Management Systems	320	256	Emulex-Persyst	244	321	Industries Best Micro	276
228	Compu Add Corp	268	237	Ericsson	114, 115	225	INMAC	275
199	Compucart	232	164	Everex	131	272	Innovative Software	144, 145
205	Compuclassics	310	248	Expert Computers	272	168	Jameco Electronics	274
234	COMPUMAIL	321	242	47st Computer	318, 319	317	Kammerman Labs	10
183	Computer Mart	265	163	FORT WORTH COMPUTERS	73	280	Leading Edge	88
185	Computer Mail Order .	74, 75	250	FTG Data Systems	73	303	LeBaugh Software	234
135	Computer Warehouse	330	246	Fox & Geller	160	385	Lifetree Software Inc.	271
213	Computers & More	284	309	Fujitsu America, Inc.	154	282	Logicsoft	48-50
175	Connecticut Software	76	306	Funk Software	183	349	Management Information Service	279
125	Conroy-LaPointe, Inc.	40, 41	252	Garden of Eden	237	378	Mansfield Software Group	282
			255	Gem Electronics	245	517	Maxell Computers	1
			136	Glenco Engineering	99	437	Maynard Electronics	38
						290	MCP Applications	267

Peering into the PC's Brain: Assembly Language

Two new books offer novices insight into advanced programming. One provides a good step-by-step guide, and the other doubles as a primer and a long-winded information outlet.

By any definition, assembly language is considered an advanced computer language, but Chao Chien's new book, *Programming the IBM Personal Computer: Assembly Language*, makes it accessible to novice users as well as to accomplished bit flippers. He initially assumes the reader has no previous knowledge of computer internals and then leads him by the hand down all the highways and byways of PC hardware and MS-DOS. In fact, I believe this is such a good introductory book that I would even recommend it to users who may never code a line of assembly language but who just want to peer into the living brain of a thinking machine.

For the record, I want to mention that the book refers exclusively to Microsoft's assembly language, not to CHASM

(a freeware product) or any of several other lesser assembly languages. And this is exactly the way it should be because the trick to understanding assembly language is not memorizing the oper-

and explaining the meanings of such phrases as the *thinking machine*, he provides the best of all cures for technophobia.

Though you could read this book while sitting comfortably in an armchair, I suggest you have Microsoft's ASM program handy so you can try out the exercises. DOS is the only software required. In addition, I recommend you use a better text editor than EDLIN, the one referred to in the examples.

Chien's writing style is relaxed, and he obviously enjoys talking about his favorite hobby. He sympathizes with users who are intimidated by the thought of designing a complex assembly program, confessing that he "personally cannot even walk and chew gum at the same time, much less think directly in code." Only rarely does his impeccable grasp of assembly language contrast with amusing abuses of English, such as when he describes "the DOS perching at an input mode," which means it is simply waiting for a command.

Scarebuglar Message

Unlike many textbooks, the first exercise you are asked to try turns out to be a useful program for inputting copyright information directly into your program. In this case, it is a routine called START that fits into your AUTOEXEC.BAT file



ation codes but learning how they operate. Chien occasionally even omits certain advanced features, such as macros, instead referring the reader to the Microsoft manual.

Chien starts with very lucid explanations of various number systems as well as such early calculating devices as the abacus. By showing how an electronic machine can perform addition via a simple array of AND, OR, and NOT circuits



Programming the IBM Personal Computer: Assembly Language
Chao C. Chien

Holt, Rinehart and Winston
383 Madison Ave.

New York, NY 10017

(212) 827-2000

Copyright: 1984

Cover Price: \$18.45

ISBN: 0-03-070442-1

CIRCLE 795 ON READER SERVICE CARD

BOOK REVIEW

and whose only purpose is to display:

C.C. Chien's IBM PC Computer Acquired on his 40th birthday \$10,000 will be rewarded on any information leading to its recovery

Insert your own name and statistics, and you have an instant scareburglar message. The remaining exercises are instructive and occasionally even flamboyant. For example, you draw Charlie Chaplin's hat on screen in one program.

With a glossary and index, appendixes on the 8088 instruction set and the BIOS and DOS interrupts, and a 50-page collection of useful subroutines, this book is a steal at \$18.45. Moreover, just reading through the subroutines is a great way to pick up some enormously clever assembly language techniques.

Programming the IBM PC & XT: A Guide to Languages

At first glance, the premise of *Programming the IBM PC & XT: A Guide to Languages* must have sounded like a neat idea to its publishers: give the language nuts everything they ever wanted to know about every IBM programming language written. Unfortunately, once the project was conceived, Clarence Germain obviously seems to have bypassed the critical planning stage because the end result is an unrelated hodgepodge of IBM manual abridgements.

Books comparing different programming languages, especially those offering insight into the history and folklore of data processing, are intriguing to me. Fifteen years ago, Prentice-Hall gave us Jean Sammet's *Programming Languages: History and Fundamentals*, a

thrilling romp through 100 electronic dialects. Germain's book, by contrast, is a superficial anthology of technical synopses of the major languages sold by a single software vendor for a single computer. He offers no insights, no folklore, and no cartoons.

The most I can say for this book is that it probably contains more information on its topic than any other book of its size. There are long chapters on the IBM PC in general, the 8088 instruction set, and the early history of computer hardware. The remainder tersely delineates IBM's current language offerings for the PC. Also included are appendixes, an index, and numerous photos of obsolete IBM coding forms from the 1960s.

Although most of the information is accurate, I get the feeling that it was copied from other sources without much

USING?...BUYING?...UPGRADING?...

A GRAPHICS PACKAGE FOR YOUR PC

You have to create graphs and charts to tell a story. Your needs vary from financial statements and personnel benefits to inventory records. Presentations are made on slides, printouts and monitors. You need a good and easy-to-manage graphics package. You need **DESKTOP GRAPHICS FOR THE IBM PC: PRINTERS, PLOTTERS, CHARTS AND GRAPHS**, the fully illustrated guide to the preparation, design and production of business graphics.

This book is written with you in mind—the business or professional user with little technical or statistical knowledge, using or planning to purchase a graphics package. You'll find out what charts are available to you...what data works best with each chart...what hardware options you have... and a comparison of the four leading software packages that will best meet your needs.

Author Corey Sandler gives you clear and non-technical introductions to graphics theory and statistics, making this seemingly impossible task, easy.

If you've been contemplating buying

a new graphics package or you just want to do more with your current package, this book is for you!

For faster service, PHONE
TOLL FREE: 9 am-5 pm E.S.T.:
1-800-631-8112 (In NJ 201-540-0445).

Also available at your local bookstore or computer store.



CREATIVE COMPUTING PRESS

Department NR1H, 39 East Hanover Avenue, Morris Plains, NJ 07950

Please send me _____ copies of **DESKTOP GRAPHICS FOR THE IBM PC: PRINTERS, PLOTTERS, CHARTS AND GRAPHS** at \$14.95* plus \$2.00 postage and handling (\$5.00 outside USA) each. Item #60-7.

Payment Enclosed \$_____. * Residents of CA, NJ and NY State add applicable sales tax.

Charge My: ☐ AmEx ☐ MC ☐ Visa

Card No. _____ Exp. Date _____

Mr./Mrs./Ms. _____
print full name

Address _____

City/State/Zip _____

☐ Please send free catalog.

BOOK REVIEW

comprehension. For example, Germain's discussion of packed data formats applies to the IBM System 370 but not to the PC, as does his remark that COBOL statements consist of "standard 80-byte records."

Germain's other boners include his claims that the cable connecting the system unit to the keyboard is nonremovable, that BASIC programs are translated to uppercase only after having been saved to disk, that expressions such as $YU7(3+X)$ are illegal, and that pressing Ctrl-Break sends X'0000' plus "a special interrupt signal" to the computer. He even says, "We use an asterisk for multiplication since there is no times sign in the character set of computers."

I can't shake the feeling that this book was undertaken as an extra-credit term project by members of a high school computer club. Some of the bloopers are actually funny: "It is generally poor programming practice to have sub-sub-directories." It certainly is, unless, of course, you happen to know what you're doing. These flaws are compounded by the lack of purpose throughout the book; it was a serious error of judgment to include only official IBM languages. Aren't C, Modula-2, and all the rest real programming languages? Do real programmers use only IBM compilers?

This book fails as a guide to languages because it offers no theoretical or historical perspective. It also fails as a collection of tutorials because it is ridiculous to

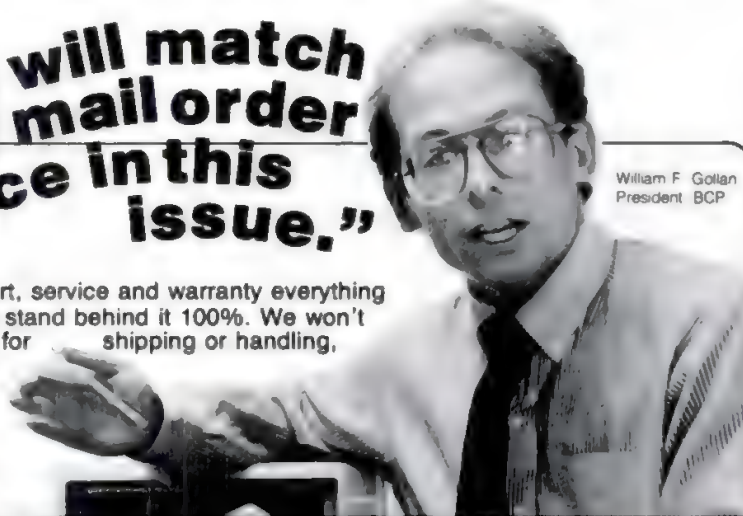
expect the average PC user to master so many languages. And it fails as a reference work because you would have to read a chapter at a time and because it is

often inaccurate. Also, reference works don't need tedious exercises at the end of each chapter. I'd have to give this "class project" a D minus. ■

"We will match any mail order price in this issue."

We'll support, service and warranty everything we sell and stand behind it 100%. We won't charge you for shipping or handling, nor will we penalize you for using a credit card.

William F. Gollan
President BCP



MONITORS		PRINTERS LETTER QUALITY	
Amdek 17GA	179.95	Amdek 1800 RGB	449.95
Princeton Max 12A	199.95	Princeton HX 12 RGB	499.95
Quadrant R3R	449.95	Princeton SR 12 RGB	639.95
MODEMS		SOFTWARE	
Princeton Plus 1200B	289.95	Prometheus 1200B	389.95
Modem 1200B	199.95	Hayes 1200 B	399.95
PERIPHERAL CARDS & ACCESSORIES		Word Processing	
Amdek 1549.95	Quadrant	Microsoft Speller	39.95
Alloy 52 85, 9 track	Cell	HomeWorld Speller	39.95
AST 6 Pak + w/64k	269.95	HomeWorld	49.95
AST Mega + 2 w/64k	269.95	Black Street Writer	54.95
AST Megapack w/256K	349.95	PFS Profl	64.95
AST Monogr +	389.95	PFS Write	89.95
Curtis Diamond	39.95	Trask Type	119.95
Curtis Emerald	49.95	WordMaster Desktop	189.95
Curtis Sapphire	59.95	Microsoft Word	244.95
Curtis Ruby	69.95	Wordperfect	259.95
Hercules Graphics	314.95	MultiMate	279.95
Hercules Color	189.95	Wordstar 2000	299.95
Memory 64k Set (9)	34.95	Wordstar 2000 +	369.95
Memory 256k Set (9)	194.95	Business & Personal	
Orchid Blossom w/64k	229.95	Sidekick	37.95
Orchid PC Net Dgh	379.95	Turner Pasca	37.95
Princeton Max 1200B	289.95	Sideways	44.95
PRINTERS DOT MATRIX		Notion 3.0	54.95
CITOH 8510	349.95	Net Worth	64.95
Citizen MSP 10	359.95	Flashcard	69.95
Gemini Delta 10 PC	359.95	Prokey 3.0	84.95
Okidata 92	399.95	PFS File	84.95
Epson FX 80	419.95	PFS Report	84.95
Gemini Radix 15PC	579.95	PFS Plan	84.95
Quadrant R3R	449.95	PFS Graph	84.95
PRINTERS LETTER QUALITY		Spotlight	94.95
Star Power Type	359.95	PC Jr Section	
DW 2000 48k	829.95	Legacy I	629.95

PC

Programming the IBM PC & XT: A Guide to Languages

Clarence B. Germain

Robert J. Brady Co.

Routes 197 and 450

Bowie, MD 20715

(301) 262-6300

Copyright: 1984

Cover Price: \$19.95

ISBN: 0-89303-783-4

CIRCLE 796 ON READER SERVICE CARD



BUSINESS COMPUTERS FREE SHIPPING CONTINENTAL
OF PETERBOROUGH
Gollan Co., Inc.



766 RT 101 W • PO Box 772 • Peterborough, NH 03458
ORDERS ONLY 800-845-3003
QUESTIONS 603 924 9406

INSTANT FINANCIAL PICTURE!

Corporate Financial Simulation Model on your IBM PC or XT with Lotus 1-2-3, Multiplan, SuperCalc, VisiCalc or PeachCalc. Also available on most CP/M & all Apple systems. A \$6,000 value for \$295.



Bottomline V

A Financial Decision Support System — budgeting, planning, analysis, and five-year forecasting.

Fill out this card and mail for complete details, or call (714) 476-2842.

- ☐ Send more information
- ☐ My check for \$10 is enclosed. Please send me a (circle one) **black and white / color** Demo for my IBM PC.
- ☐ Please send me Bottomline V for _____ Spreadsheet on the _____ computer. My check for \$295 plus \$5 for shipping and handling is enclosed.

Name _____ Title _____
Company _____ Phone _____
Street _____
City _____ State _____ Zip _____

Mail to: ILAR Systems, Inc. • 1300 Dove St., Suite 200 • Newport Beach, CA 92660

CIRCLE 224 ON READER SERVICE CARD

A COMPREHENSIVE PROFESSIONAL-LEVEL

net worth

PORTFOLIO MANAGEMENT SYSTEM

A Steal!

JUST \$59⁹⁵
(Reg. \$295.00 Value!)

New enhanced Version 1.1C

net worth™ 1.1C — all that you'd expect at a price that leaves money left over to invest. Handle single or multiple portfolios. Access Dow Jones or manually enter data. Manage stocks, bonds, T-bills, mutual funds, precious metals, even cash or equivalents. Follow owned as well as designated securities. Update with latest, daily or weekly prices. Generate 12 reports for thorough record keeping. Great for IRA's, Keoghs or Trust Accounts. Best of all there's a 30 day money back guarantee and it's tax deductible too! Requires: IBM PC/XT or MS/DOS compatible, screen display, printer and DOS 1.1, 2.0 or 2.1.

Order your copy of Net Worth™ today

CALL TOLL FREE

1-800-433-3605 TX 817-473-9249

MC or Visa Accepted



BULLISH™
INVESTMENT SOFTWARE

P.O. Box 853 • Mansfield, TX 76063

Please add \$5 for shipping & handling

CIRCLE 102 ON READER SERVICE CARD

CALL TOLL FREE 1-800-528-1054

COMPUTER WAREHOUSE

PRINTERS

Anadex

9625 B
WP8000
DP8500

Brother

DX-15
HR-25
HR-35

C-Itch

8510 Parallel (Prowriter)
8510 BPI
F-10 Parallel
55 CPS Parallel

Comrex

CR11E
CR IV
ComRiter 420

Diablo

620
630
630 ECS/IBM

Epson

All Printer Models

Inforunner

RiteMan w/Tractor
RiteMan 15
RiteMan Blue w/Tractor

Juki

5500
6100
8300

NEC

2050
3650
7730
8850

\$1129
\$2039
\$2259

\$369
\$649
\$875

\$315
\$335
\$909
\$1049

Call
Call
Call

\$894
\$1499
\$1699

Call

\$244
\$499
\$299

Call
\$399
\$699

\$669
\$1359
\$1649
\$1779

PRINTERS

Okidata All Printer Models

Panasonic

1091
1092
1093

Silver Reed

EXP400 Parallel
EXP500 Parallel
EXP550 Parallel
EXP770 Parallel

Star Micronics

All Printer Models

Tally

Sprint 80

Toshiba

P1340 Parallel
P1351 Parallel

DISK DRIVES

Alpha Omega

Turbo 10

Imomega

Bernoulli Box for IBM
10 Megabyte
20 Megabyte

Call

\$235
\$439
\$709

\$235
\$295
\$399
\$705

Call

\$255

\$709

\$1215

\$739

\$1950
\$2660

SPECIAL OF THE MONTH

MAXELL

MD-2 D/S D/D (Qty. 100) **\$199**

MONITORS

Amdak

All Monitor Models

Princeton Graphic

HX-12

Taxan

121 Green
121 Amber
420 RGB
425 RGB/Green

PLOTTERS

Enter Sweet-P600

DISKETTES

Maxell MD-2 (Qty 100)

MODEMS

Hayes

1200B

Novation

Smart Cat Plus

Call

\$479

\$125

\$134

\$399

\$410

\$780

\$199

\$379

\$315

COMPUTERS

Columbia

All Computer Models

Sanyo

All Computer Models

Zenith All Computer Models

TECMAR

Graphics Master
128K Dynamic Memory
256K Dynamic Memory
Captain 128K
Captain 256K

BOARDS

AST Six Pak Plus

Paradise

Modular Graphic 06-A1
Five Pak

Call

Call

Call

Call

\$440

\$225

\$299

\$299

\$399

\$285

\$275

\$150



2222 E. Indian School Rd. • Phoenix, Arizona 85016

Order Line: 1-800-528-1054

Order Processing & Other Information: 602-954-6109

Store Hours: Mon-Fri 10-5:30 Saturday 9-1 Order Line Hours: Mon-Fri 10-5:30 Saturday 9-1

Prices reflect 3% to 5% cash discount. Product shipped in factory cartons with manufacturer's warranty. Please add \$8.00 per order for UPS shipping. Prices & availability subject to change without notice. Send cashier's check or money order. All other checks will delay shipping two weeks.

CIRCLE 135 ON READER SERVICE CARD

Throw Out Your Index Cards

Here's how to use your editing system to take notes, keep files, and build a database for research or writing projects. It's a lot more efficient than shuffling index cards.

I hated to admit it, but I was stumped. My husband Dale, a dermatologist, wanted to test a new way of using 5-Fluorouracil to treat psoriasis. But he needed a grant. To get the grant, he had to write a proposal. "Can our PC help me organize my notes?" he asked.

It sounded like a job for an index-card-style data manager like VisiCorp's *VisiDex* or Fastware's *Thor*. But Dale, a recent master of *Volkswriter*, was accustomed to the amenities of a powerful word processing program. Although I can hack some passable computer code, I knew I couldn't churn out the equivalent of a *Volkswriter* with data management abilities to boot. "The software you need isn't on the market yet," I told him. "Why not stick to using index cards?"

It Works

Dale didn't give up. He described his dilemma to one of his patients, a computer pro who sells customized business systems. "No sweat," the patient told him, proceeding to describe how to use *Volkswriter*, or any editing program with a search function (even EDLIN will do), as a primitive but effective manager of free-form data.

Here's how it works. First, using your editing program, list the main categories or subjects you will cover in your database, in alphabetical order. The list



doesn't have to be exhaustive—you can add more later.

If your PC runs DOS 2.0 or higher and you fit each title on a single line, you can use the DOS SORT filter to sort your list. For example, to sort a file called RESEARCH.DTA you would type

```
SORT <RESEARCH.DTA>
SORTED.DTA
```

SORTED.DTA will now hold your sorted list. This list, which will always appear at the top of your database, is your index. Figure 1 shows part of Dale's index. Note that he used only uppercase letters and that the first heading he employed is BIBLIOGRAPHY. You'll see

why that's important soon.

Next, skip a few lines and copy your index. Most word processors include a block copy command to let you copy your list using three or four keystrokes. (The DOS 2.0 and later versions of EDLIN also have such a command.) This second list is the skeleton of your data section. The categories function like the header titles in an index-card file box; you insert each note after the appropriate header.

Taking Notes

Now you're ready to start entering data. Use your program's search function to jump to the BIBLIOGRAPHY

WRITING

header in your data section. If you've written your headers in uppercase letters and instructed your program to pay attention to case, the search will locate the heading rather than the word *bibliography* buried in your text.

Next, record the bibliographic information about your first source. The first paper Dale read was "Topically Administered Fluorouracil in Psoriasis," number 1 in his bibliography (Figure 2).

The first item that caught his eye concerned the treatment's effectiveness. He used the editing program's search function to jump to the EFFECTIVENESS header in the data section. There he noted that 13 patients treated with 5-Fluorouracil were clear of the disease for 6 to 12 months. To keep track of the source of the information, he wrote the reference number (1) next to the citation, as shown in Figure 2. He repeated this process to record each new note.

After Dale completed his literature review, his database became the working outline for a large part of the proposal. Even the bibliography was in near-final form. He simply had to put it in alphabetical order and use the editing program's search-and-replace function to change the reference numbers.

Dale claims that the PC database has several advantages over the manual, index-card system. It organized his data by topic rather than source. It gave him a tidy set of notes. And the printout was a handy, impressive reference tool when he presented his proposal to the research committee.

The system has at least one drawback. Unless you have a portable computer, you can't take notes while you're away from your PC. Dale solved this problem by photocopying articles in the library and bringing them home to take notes.

Many other tasks that you can orga-

nize using a Rolodex or index cards also lend themselves to this kind of data management. For instance, you could use it to keep track of a simple mailing list. Each category would define a section of your list. To print mailing labels, make sure that the spacing in your list matches the spaces on the label stock.

Managing your mailing lists can become more sophisticated if your word processing program can generate custom form letters. Such programs often require that addresses in your list appear on a single line in a specified form. You can usually add some key words or categories to each address and then use the DOS FIND filter to produce a mailing list of addresses in a certain category. If you called your mailing list MAIL.LST, and you wanted a specialized list of students, you could command:

```
FIND "STUDENT" MAIL.LST >
STU.LST
```

The STU.LST file would then include addresses of people you had classified as students. This same technique works if you want to create a mailing list using a category in the address itself, such as ZIP code or city name.

You can also manage other kinds of lists, such as record collection catalogs or simple inventories. Use the DOS SORT filter to keep your list in order and the FIND filter to get a quick look at, say, the number of items you have left in stock or which of your records includes a certain song. To add new data or make changes, run your text editor and let its search function take you to the right place.

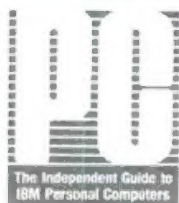
This system won't threaten *dBASE II*'s market share, nor is it likely to take business away from popular file management programs. It won't prompt you for data or do any preliminary checking. Yet it can be very versatile, and—good news for students and researchers on low budgets, before the grants are awarded—it doesn't cost a penny extra. ■

```
BIBLIOGRAPHY
EFFECTIVENESS
PERCUTANEOUS
ABSORPTION
PHARMACOLOGY
TOXICITY IN TOPICAL THERAPY
    TOXICITY:SYSTEMIC
    TOXICITY:GI
    TOXICITY:SKIN
TOXICITY IN SYSTEMIC THERAPY
```

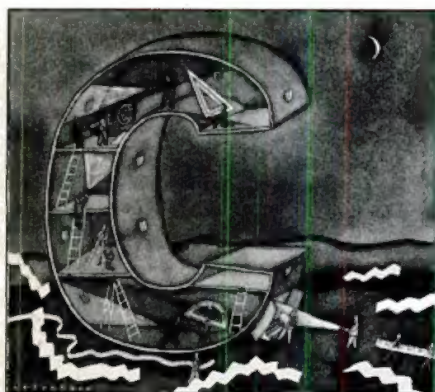
Figure 1: Index for an index-card-style database.

```
BIBLIOGRAPHY
1)Tsuji T., Sugai T., 1972. "Topically Administered Fluorouracil in
Psoriasis." Arch Derm. 105:208-212.
EFFECTIVENESS
13 patients treated with 5 percent ointment under saran wrap
occlusion 24 hours/day for 7 days had complete clearing lasting
6-12 months.(1)
```

Figure 2: Part of the data section in Dale's database on the use of 5-Fluorouracil for the treatment of psoriasis.



Coming Up



C and BASIC Debuggers

Do you groan at the thought of debugging your BASIC or C programs? *PC* reviews two debuggers that make this time-consuming task a relative breeze.

Voice Recognition and Speech Synthesis

With new software and boards, PCs can hear and speak. Some software packages and hardware enable PCs to recognize speech, store it in digital form, and display it on a screen as words. Other software and hardware combinations synthesize speech, converting digitally stored sound into wavelengths and then using a speaker to reproduce them. Some packages perform both functions. This technology offers new prospects for telephone message systems and voice mail, which store messages on disk instead of using real people for these monotonous tasks.

PC reviews some of the neatest of these speech synthesis and voice recognition packages. In addition, we explore how they're being used to help everyone from businesspeople to the handicapped. And Winn Rosch explains how he built a voice synthesizer from a kit.

Sales Tracking

Entrepreneur Randy Winters has designed a sales-tracking program called *EasySales Pro* to help salespeople determine how much time and effort they should spend on a particular prospect, and how close they are to meeting their quota. Heidi Waldrop describes how Winters uses his program as a tool in selling artist Gahan Wilson's work.

Two Databases

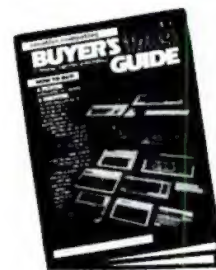
Despite *PC*'s extensive coverage of DBMS packages in Project: Database, new DBMS packages continue to flood onto the market, and we're committed to continue covering the latest ones. We test both the *Kaleidoscope* database and *GOLDATABASE* and provide charts describing their good and bad points. John Phillips discusses whether *Kaleidoscope* is as good as its packaging looks, and Russell Lipton finds *GOLDATABASE* a good product for computer novices and experts but wonders whether its design takes into account the needs of the vast middle ground of intermediate nonprogramming users.

ANNOUNCING

creative computing's

1984 BUYER'S GUIDE

TO PERSONAL
COMPUTERS &
PERIPHERALS



Advice you can trust on selecting personal com- puters, peripherals and electronic games

Unless you have the memory of a computer there's no way you can keep track of all the games, programs and peripherals available for your computer. And even if you could, you'd still have a problem figuring out what's best for your needs and how to get the most for your money.

That's why you need the *1984 Buyer's Guide to Personal Computers & Peripherals*. It's a comprehensive collection of product reviews and consumer-oriented shopping advice put together by the experts at *Creative Computing* magazine.

You'll get a rundown of what's new on the market. Analysis of new product performance, reliability, operation, applications, cost—even what kind of repair service you can expect. Easy-to-understand comparisons between different models. Tips on bugs and design problems. Plus "inside" information you won't get from manuals or salespeople.

Don't buy until you've consulted the *1984 Buyer's Guide to Personal Computers & Peripherals*! Order your copy today.

Send to: FE7C
Creative Computing Buyer's Guide
CN 1914, Morristown, NJ 07960

YES! Please rush me *Creative Computing's 1984 Buyer's Guide to Personal Computers & Peripherals*. Enclosed is my check or money order for \$3.95 plus \$1 for postage and handling.

Mr./Mrs./Ms. _____
(please print)

Address _____

City _____

State _____ Zip _____

Please make check payable to Creative Computing Buyer's Guide. CA, NJ and NY State residents please add applicable sales tax. Price outside U.S.A. is \$6.

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

CIRCLE 260 ON READER SERVICE CARD

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

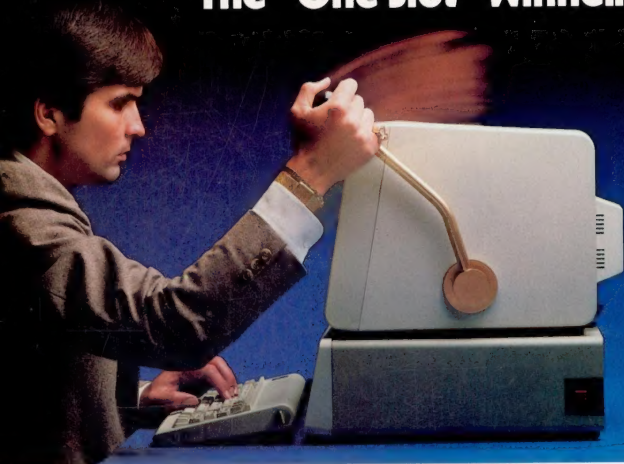
All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • APPLE is a trademark of Apple Corp. • IBM is a trademark of IBM Corp. • OSBORNE is a trademark of Osborne Corp. • CP/M is a trademark of Digital Research • XEROX is a trademark of Xerox Corp.

Rio Plus II™ For The IBM PC Or XT. The "One Slot" Winner.



All The Power & Performance You Can Handle In One Exceptional Multi-Function Board.

When it comes to getting more usable features, greater performance, and better benefits into—and out of—your IBM Personal Computer...Rio Plus II is the *very best* multi-function board you can buy. Why? Because the Rio Plus II includes the very best features of *two* power-packed multi-function boards (the Rio Plus, and Super Rio)—conveniently built into *one*. Without a bet, the Rio Plus II offers the *most complete* one slot answer to your need for greater memory and additional ports.

"Pack" The Odds In Your Favor

Now, you can have almost everything you want or need. All in one slot. Rio Plus II gives you: One or two serial ports; a parallel port; an IBM compatible game port; the 'PC Accelerator' software (offering emulation of *two* RAM disks and a parallel print buffer); a battery operated clock/calendar (remembers date/time even with PC turned off); and *additional memory* of up to 384K.

Using the RS-232C serial ports, you can easily connect

mice, modems, plotters, (serial) printers, or other necessary peripherals. With the parallel port, you'll be able to operate any IBM compatible (parallel) printer, or SASI (Shugart

Associates Standard Interface) hard disk controller. And courtesy of the PC Accelerator™, you get printer buffering and RAM disks which can even survive a warm boot. (For example, do an ordinary reset, and all the data entered on both RAM disks will *still* be there. *Everytime.*)

The Winning Combination

Rio Plus II is totally software compatible with IBM's hardware adapter boards. And, the Rio Plus II saves you time, money, slots...*and* hassle. You'll have additional memory and functions available—*exactly* when you need them. At a price that's *very* competitive. And just think what you can do with all the *other* slots.

Rio Plus II. The only (card) game in town that *consistently* lets you win big. See your local dealer for the inside story. Or call or write STB Systems, Inc., 601 North Glenville, Richardson, Texas 75081 (214) 234-8750.

CIRCLE 430 ON READER SERVICE CARD



STB™
STB Systems, Inc.

IBM PC, XT are registered trademarks of International Business Machines Corporation.

Expanding Microcomputing

PC Accelerator is a registered trademark of ResiCorp.

Now make your PC paint.



Make it draw. Shade. Color. Erase. Create perfect circles. Ellipses. Rectangles. With the touch of a button. Print on screen and off in a variety of type fonts. Gothic. Roman. Old English. Script. Print in light. Medium. Bold. Italicize. Underline. Outline. Kern. Make it print in a wide range



Tecmar
THE POWER BEHIND THE PC

of point sizes. Make it cut. Make it paste. Make it all happen in one package. With Tecmar's Graphics Master™ Board and PC Paintbrush* Software.

Make a trip to your dealer for a demonstration. Or, make a call to Tecmar for the dealer nearest you. (216) 349-0600.

*Registered trademark of the ZSoft Corp.